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Manufacturing Trends: Long-Term Context for Today's Policy Issues

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Abstract. Members of Congress have become increasingly concerned about a perceived decline in U.S. manufacturing, particularly as it may affect employment levels in their states or districts. For two years after the economy emerged from a relatively shallow recession in 2001, there was a continuing loss in manufacturing jobs. And even as the recovery progresses, many fear that new non-manufacturing jobs will not have the same relatively high levels of wages and benefits traditionally associated with manufacturing. By contrast, despite the recession of 2001, the level of real (inflation-adjusted) U.S. manufacturing output as of mid-2005 stood almost 30% higher than at a similar point after the recession of 1991, with about 2.5 million fewer manufacturing employees. This is more than three times real manufacturing output in 1960, when a comparable number of people were employed in manufacturing.

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Summary

Although the U.S. economy has emerged from a relatively shallow recession in 2001, by mid-2005 there was still no recovery in the number of manufacturing jobs. Nevertheless, real output in U.S. manufacturing in early 2005 stood more than 30% higher than at a similar point after the recession of 1991, even with 2.5 million fewer manufacturing employees. Members of Congress are increasingly concerned as to how these developments affect manufacturing employment in their states and districts. This report revises a CRS report released in early 2004 to provide a baseline study for Members of Congress on long-term trends in manufacturing output, productivity and employment, including some extensions of time-series data.

Employment in manufacturing has declined as a share of overall employment since 1960 at about the same rate of decline as the current-dollar share of GDP accounted for by manufacturing output. Both measures have fallen from 30% to less than 15%. Only about 14 million people were employed in manufacturing by mid-2005. The all-time peak was more than 19 million in 1979, and each successive cyclical economic peak since then has seen fewer persons so employed. But measured on a real basis, manufacturing output kept pace with total output in other sectors, despite its shrinking share of employment. The explanation seems to lie in rising labor productivity, which grew 50% more quickly for manufacturing than for the total economy between 1960 and 2000.

These overall trends in manufacturing mask highly divergent performances among individual industries. Output and productivity among individual sectors do not tend to cluster around overall average levels of performance. This report examines in more detail three specific manufacturing sectors: information technology industries, which have been high-growth areas of the economy and internationally competitive; the automotive sector, which has been affected by high levels of import penetration and is divided between the "Big Three" U.S.-based manufacturers and the U.S. facilities of internationally based firms; and, textiles and apparel, which are facing a high level of import competition and have experienced large numbers of job losses.

Globalization, meaning the increased internationalization of markets, inputs and investment, has had a major impact on U.S. manufacturing. Since 1980, the U.S. trade balance in manufactured goods has gone from a surplus to a deficit of nearly $500 billion. The deficit is concentrated in consumer and automotive products, but even capital goods moved into deficit in 2003. While foreign outsourcing (also known as offshore outsourcing or offshoring) has become a major issue, the report notes evidence that nearly all major industrial countries, including China, have lost manufacturing jobs since 1995. Changes in the dollar exchange rate and U.S. international trade agreements may also have affected domestic manufacturing.

The report concludes by examining various approaches to industrial and industrial competitiveness policies. This CRS report will not be updated.

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Manufacturing Trends: Long-Term Context for Today's Policy Issues

Overview of Manufacturing in the U.S. Economy[1]

Members of Congress have become increasingly concerned about a perceived decline in U.S. manufacturing, particularly as it may affect employment levels in their states or districts. For two years after the economy emerged from a relatively shallow recession in 2001, there was a continuing loss in manufacturing jobs. And even as the recovery progresses, many fear that new non-manufacturing jobs will not have the same relatively high levels of wages and benefits traditionally associated with manufacturing. By contrast, despite the recession of 2001, the level of real (inflation-adjusted) U.S. manufacturing output as of mid-2005 stood almost 30% higher than at a similar point after the recession of 1991, with about 2.5 million fewer manufacturing employees. This is more than three times real manufacturing output in 1960, when a comparable number of people were employed in manufacturing.[2]

Employment Trends in Manufacturing

Figure 1 shows that, as compiled by the Department of Labor's Bureau of Labor Statistics (BLS), the number of manufacturing employees in the United States in 2002 was about the same as it was in 1960. The total was about 15 million, which is also about the same as in the early 1950s, during the Korean War boom. But, of course, the U.S. economy and population are now much larger, so that a far smaller share of the workforce is directly employed in manufacturing. The level of manufacturing employment has tended to move up and down with the business cycle, but with successively lower "peaks"after the three recessionary periods of the 1980s and 1990s ("recessionary years," defined here as real growth of 1.0% or less in gross domestic product, are marked in the figure). Thus, the secular trend in manufacturing employment has been down since 1979, when 19.4 million persons were so employed in the United States. The number fell by 2.4 million over the next three years with the impact of the "double-dip" recession in 1980-82, and recovered to its next cyclical peak of 18 million jobs in 1989. Following the recession of 1990-91, the next peak employment year was 17.7 million in 1998, after which manufacturing employment began to fall, well in advance of the 2001 recession.

The August 2003 manufacturing employment level of 14.6 million persons was 3 million lower than the 1998 peak. It was also 1.25 million lower than when the

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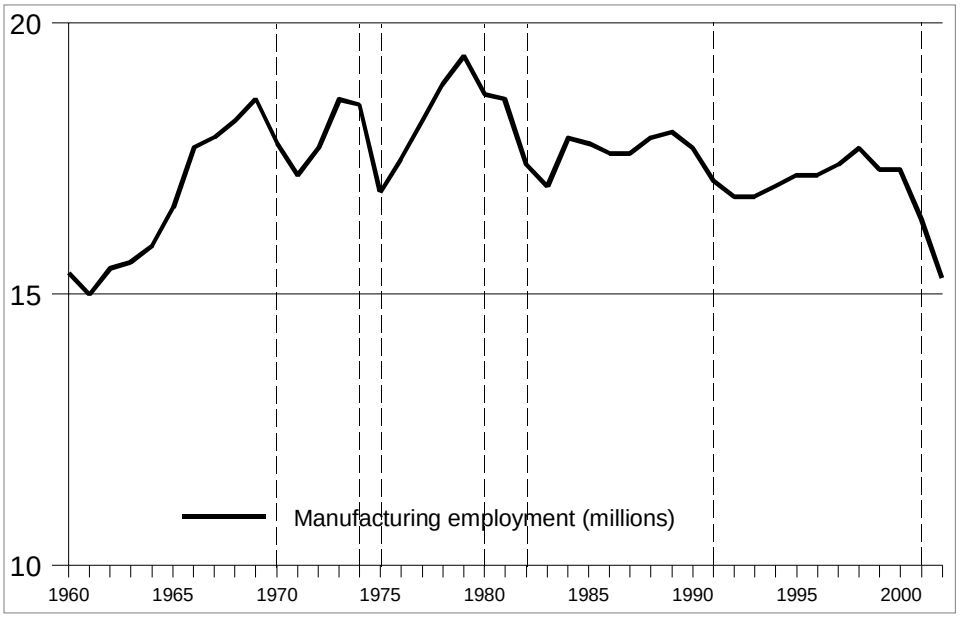
[1] This section was written by Stephen Cooney.

[2] U.S. Dept. of Labor. Bureau of Labor Statistics (hereafter BLS). "National Employment, Hours and Earnings" and "Output: Manufacturing" series (data may be subject to revision).

latest recession ended in November 2001. Thus, manufacturing accounted for all of the net total nonfarm job loss of 1.1 million in 2001-03.

Figure 1. Manufacturing Employment



Years with dashed lines indicate recessions or real growth less than 1%.
Source: U.S. Dept. of Labor. Bureau of Labor Statistics (BLS). "National Employment Hours and Earnings" data from BLS website (www.bls.gov – proceed from directions on the site).
Definition of manufacturing based on North American Industrial Classification System (NAICS).

Both the fall in manufacturing employment before the 2001 recession, and the slowness of the recovery in both manufacturing and total employment after a recovery began in late 2001, also suggest that we may be experiencing structural changes in the economy. Possibly, long-term structural changes to increase output per hour of labor are overwhelming the normal employment trends related to the business cycle.[3] Research at the New York Federal Reserve Bank found that even the "jobless recovery" after 1991 began to create jobs by 15 months after it began. By contrast, the U.S. economy was still shedding jobs in mid-2003, almost two years after economists decided that the recovery had begun. Indeed, the unprecedented slowness of the employment recovery in this case caused a long delay in the decision of National Bureau of Economic Research, the accepted arbiter for declaring when recessions begin and end, to determine that November 2001 marked the beginning of a recovery. The Fed researchers also noted that layoffs are now increasingly permanent, not temporary, as in the past, when employers wanted to keep experienced employees around to be rehired when the "slowdown" in orders picked up again. They noted some industries closely associated with high technology (such

[3] This concept is explored in Federal Reserve Bank of New York. Erica L. Groshen and Simon Potter, "Has Structural Change Contributed to a Jobless Recovery?" *Current Issues in Economics and Finance*, IX:8 (August 2003), which provides the data and analysis for the following comments. For a more general analysis of employment decline and the slow recovery in employment from the 2001 recession, see CRS Report RL32047, *The "Jobless Recovery" from the 2001 Recession: A Comparison to Earlier Recoveries and Possible Explanations*, by Marc Labonte and Linda Levine; and, CRS Report RL30799, *Corporate Downsizing and Other Mass Layoffs*, by Linda Levine.

as electronic equipment) or considered high fliers in the 1990s (communications, and securities and commodity brokers) are downsizing post-2001 at a faster rate than the general cyclical trend, suggesting a structural shift and permanent downsizing.[4]

Employer forecasts and actions in late 2003, as reported in *Business Week*, predicted a strong recovery ahead in the U.S. labor market. The article also stated that the slow and uncertain start of the present recovery discouraged employers from rushing too quickly to make permanent new hires. It forecast that an employment recovery could start in late 2003, though it might not be robust until mid-2004, when the growth cycle might be firmly re-established. On the other hand, even this optimistic analysis found that "... new jobs may not be coming back soon in the hardest-hit corners of the economy. Some companies, especially in manufacturing, are still concentrating on cost-cutting rather than expansion." The article cited recent large job cuts announced at paper, apparel and information technology equipment manufacturing companies. However, the article did also emphasize that productivity gains would also mean an increase in U.S. jobs in the longer term, not a decrease.[5]

It may be that, as argued by Federal Reserve Board Chairman Alan Greenspan, "the U.S. economy has been gradually moving toward an economy based on 'conceptual' assets, such as ideas protected as intellectual property, and away from 'physical' assets, such as plants and production machinery."[6] Nevertheless, there is an increasing perception that manufacturing employment and the manufacturing role in the economy are under pressure, and that this may adversely affect U.S. standards of living. For example, the *Washington Post* editorialized about "The Lost Factory Job," while the *Greensboro News & Record*, in the heart of the hard-hit textile manufacturing belt, headlined an editorial, "Saving Factory Jobs Critical to the Economy."[7] In a more sweeping fashion, Louis Uchitelle, chief economics correspondent of the *New York Times*, wrote, "Manufacturing is slowly disappearing in the United States ... [T]he essence of a great world power is its edge in producing not services but manufacturing products that other people want ..."[8] The National Association of Manufacturers (NAM) sponsored a study that warned:

> If the U.S. manufacturing base continues to shrink at its present rate and [its] critical mass is lost, the manufacturing innovation process will shift to other

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[4] *Ibid.*, esp. Chart 1.

[5] *Business Week*, "Ready to Say 'Help Wanted'?" (September 22, 2003), pp. 36-37, which includes quotation.

[6] As summarized by Brett Ferguson, "Jobs Lost Since 2001 Recession May Not Return, New York Fed Study Says," *Daily Report for Executives*, Sept. 8, 2003, p. EE-6. The idea of "conceptualization" of the U.S. economy was first laid out by Chairman Greenspan in "Market Economies and the Rule of Law," remarks to a Federal Reserve Bank of Atlanta conference (Sea Island, GA), April 4, 2003.

[7] *Washington Post*, September 1, 2003; *Greensboro News & Record*; September 3, 2003.

[8] *New York Times*, August 17, 2003.

> global centers. Once that happens, a decline in U.S. living standards in the future is virtually assured.[9]

The report, however, emphasized that the U.S. manufacturing sector continues to make positive and beneficial contributions to the U.S. economy, in part through:

> Manufacturing productivity gains ... historically higher than those of any other economic sector — over the past two decades, manufacturing averaged twice the annual productivity gains of the rest of the private sector. These gains enabled Americans to do more with less, increase our ability to compete, and facilitate higher wages for all employees.[10]

This ability "to do more with less," a sign of strength in manufacturing, paradoxically means that fewer manufacturing employees may be needed, if overall demand for U.S. manufactured goods, domestically and abroad, is not rising fast enough. Then-president of NAM Jerry Jasinowski, reflected on this paradox:

> [He] is resigned to the fact that many of the factory jobs cut will not reappear. But he is also proud of the fact that productivity growth in manufacturing has consistently outstripped that of the rest of the U.S. economy, yielding great benefits to the nation overall.[11]

The NAM study further emphasized that the manufacturing sector has a stronger multiplier effect than any other major sector of the economy. It cited Commerce Department calculations released at the end of 2002, which showed that each additional dollar in U.S. final demand for manufactured products required $1.43 in intermediate goods and services, with associated employment. For natural resources products, each additional dollar of demand required $1.22 in intermediate goods and services. For the output of all other sectors, each $1 of final demand required less than $1.00 of intermediate goods and services. This ranges from transportation, at about 90¢, to financial and business services, which generate only 50¢ in intermediate goods and services.[12]

Manufacturing Output and the U.S. Economy

Does the decline in manufacturing employment indicate a general decline in manufacturing's relative role in the economy? Manufacturing's share of employment and of current dollar gross domestic product (GDP) have indeed fallen over the long term. Manufacturing accounted for less than 15% of total employment and GDP in 2002, compared with about 30% in 1950 (**Figure 2**). This decline in manufacturing's

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[9] Joel Popkin & Co. (for NAM Council of Manufacturing Associations). *Securing America's Future: The Case for a Strong Manufacturing Base* (Washington, June 2003), p. 3.

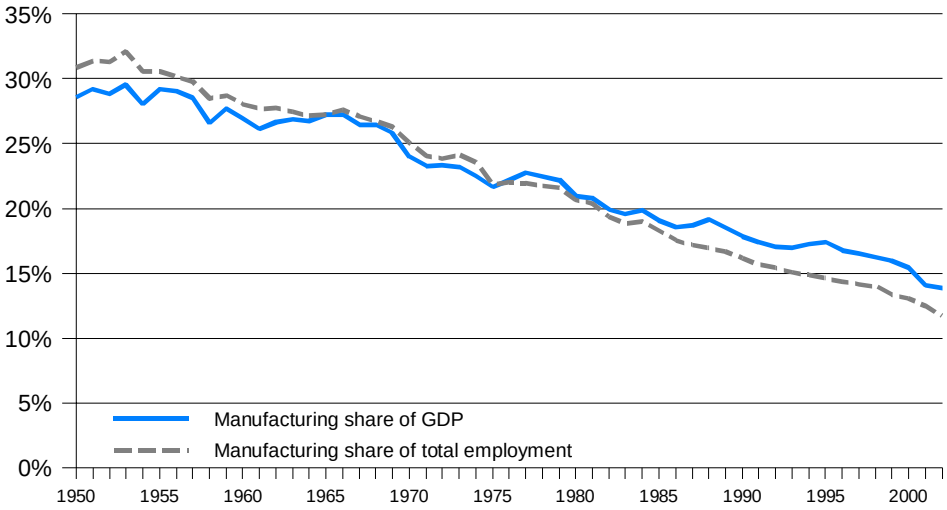
[10] *Ibid.*, p. 1.

[11] John M. Berry, "Some Lost Jobs May Never Come Back," *Washington Post* (Nov. 29, 2003), p. E2.

[12] Popkin, *Securing America's Future*, pp. 4-10 and Chart 1, based on Commerce Department 1997 benchmark input-output tables, the latest available data.

share was neither cyclical nor unique to the business cycle subsequent to 2000, as **Figure 2** shows.[13]

Figure 2. Manufacturing Share of U.S. GDP and Employment



Sources: **GDP data**: *Economic Report of the President*, Feb. 2003. Table B-12 for 1959-1998; U.S. Dept. of Commerce. Brueau of Economic Analysis (BEA). Robert E. Yuskavage and Erich H. Strassner, "Gross Domestic Product by Industry for 2002." Table 1 for 1999-2002 estimates; and unpublished data from BEA website "Gross Domestic Product by Industry" (www.bea.doc.gov), as viewed on September 16, 2003. **Workforce data:** Same as Figure 1.

This long term relative decline does not necessarily indicate a weakness in manufacturing, but reflects the sector's faster gains in efficiency relative to those of the rest of the economy. This has tended to lower the prices of manufactured goods relative to the prices of goods and services produced in other sectors,[14] "causing" manufacturing's share of current-dollar GDP to decrease noticeably.[15]

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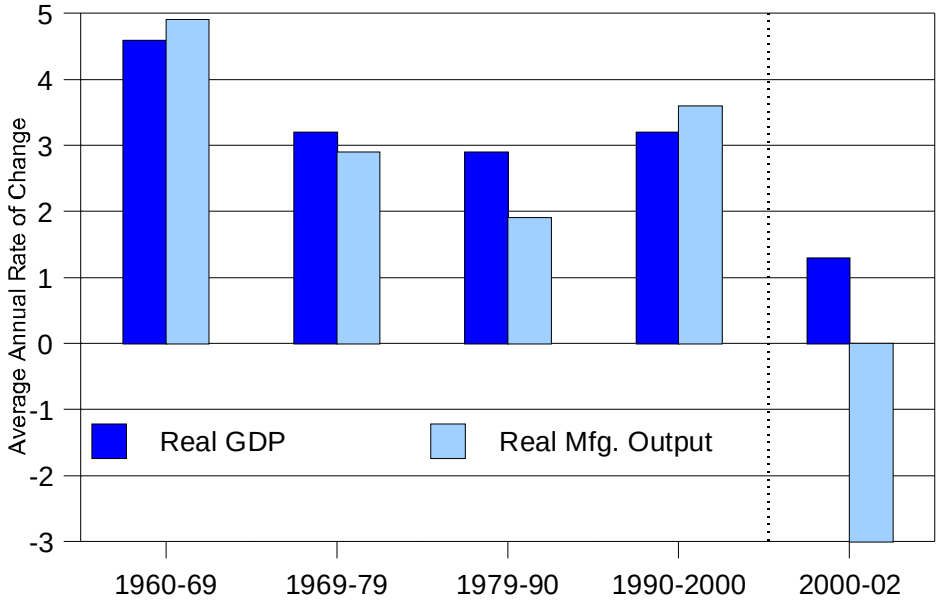
[13] The U.S. Dept. of Commerce, Bureau of Economic Analysis (BEA) issued revised estimates of gross domestic product and related national income and product data shortly after research for this report was completed. In its release, BEA states that "the picture of the economy shown in the revised estimates is very similar in broad outline to the picture shown in the previously published estimates."

[14] The average price for manufactured goods as whole rose 62% between 1977 and 2001, compared with 143% for GDP as a whole, based upon price indexes derived by the BEA (www.bea.doc.gov/bea/dn2/gpo.htm).

[15] GDP in current dollars is a measure of the total value of goods and services produced in the economy at prevailing prices at a given point in time. The "weight" of a component of GDP thus is based upon what purchasers actually pay for a product or group of products in the current period, not what they might have paid using a past period's prices. BEA says that "current-dollar shares of GDP provide a more accurate measure of the relative importance of components" than shares based upon chained dollars. (Chained-dollar estimates are a variant of constant dollar output.) See J. Steven Landefeld, Brent R. Moulton, and Cindy M. Vojtech, "Chained-Dollar Indexes: Issues, Tips on Their Use, and Upcoming Changes," *Survey of Current Business* (Nov. 2003), pp.8-16. However, a sector's share of GDP in current dollars in a later period may be understated if the prices of its goods or services have declined relative to those of other sectors, as for many manufactured products. Calculating a sector's share using constant dollars eliminates such an effect,

(continued...)

Figure 3. Real GDP and Manufacturing Output Growth



Source: **Overall GDP data**: *Economic Report of the President (2003).* Table B11; and, BEA. Yuskavage and Strassner for 2002 data.
Manufacturing Output: BLS. "Major Sector Production and Costs Index." (www.bls.gov) as viewed on September 16, 2003.

If we compare the growth of manufacturing output and total GDP on a real (constant dollar) basis (**Figure 3**), we find that manufacturing has performed about as well as the rest of the economy, and better in the 1990-2000 growth cycle. A "peak-to-peak" comparison (using the last full year before subsequent recessions) of manufacturing and GDP in constant dollars (removing the effects of price changes but not removing quality improvements) shows that manufacturing output grew 3.3% per year on average between 1960 and 2000, versus 3.4% for GDP.[16] Real manufacturing output grew nearly as fast or faster than real GDP during three of the four economic expansions during that period, the exception being the 1980s. In the 1990s, real output in manufacturing increased 3.6% per year on average, whereas real GDP rose 3.2%; the share of real GDP accounted for by manufacturing *increased* from 16.4% in 1990 to 17.2% in 2000.[17]

In 2001-02, manufacturing output in real terms fell at an average annual rate of 3.0%, while the economy as a whole grew by 1.3%, indicating much stronger real

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[15] (...continued)
although it has some drawbacks. This basis is used in the following paragraph and in figure 3.

[16] To compare the rates of growth, Figure 3 uses data for real GDP calculated by BEA and for constant-dollar manufacturing output, data published and used by BLS in its measurements of productivity change. BLS data are used for manufacturing real output, because BEA does not have a series of constant-dollar output by industry for the years before 1977. For further information, see "GDP by Industry" at [http://www.doc.gov/bea].

[17] See Fig. 4 in U.S. Dept. of Commerce, *Manufacturing in America: A Comprehensive Strategy to Address the Challenge to U.S. Manufacturers* (Jan. 2004), which shows essentially the same relationship between real manufacturing output and the total economy between 1977 and 2000.

growth over the past two years for the non-manufacturing sectors. However, this is only a two-year period, and not measured on the same "peak to peak" basis as the other periods in the figure. And, as the Department of Commerce 2004 report noted, manufacturers are usually hit hardest during a recession: manufacturing output on average has fallen by 7% against an average 2% fall in total GDP in eight recessions since 1950. In the "relatively mild" recession of 2001, however, that study found that the manufacturing sector was not only hit harder than the overall economy, but was affected by a particularly slow recovery. It ascribes this combination of effects to four causes:

- A "significant retrenchment in business technology following a surge in such investment" in the 1990s. (The impact on U.S. high technology, especially information technology manufacturing, is explored in a later section of the present report.)
- An especially sharp drop in inventories; the Commerce Department found that "inventory liquidation was much more severe in the 2001 recession than it was in the 1990-1991 recession."
- "... Uncertainty caused by the events of September 11, 2002, which depressed investment and demand."
- "... The extent to which slower growth at home was compounded by the effects of slower growth abroad, particularly the dramatic drop in U.S. manufacturing exports to our principal export markets."[18] The details and impact of slow manufactured export growth are discussed in a later section of the present report.

Productivity and Manufacturing Output

Real output in manufacturing kept pace with the real gains of the economy as a whole despite a continually declining share of total employment, because of superior labor productivity gains, as measured by the BLS series on output per person per hour. Over the entire period 1960-2000, the average annual increase in productivity was 50% greater for manufacturing than for total nonfarm business activity: 3.0% against 2.0%. Manufacturing labor productivity improvement in the 1970-90 period was also higher than total nonfarm business productivity, and in the 1990s, it increased to double the overall business average.

Presenting these data for the same periods as in Figure 3, there was little difference between the two measures in the 1960s, as both improved at an annual average of 2.9%. In the 1970s and 1980s, both rates of labor productivity improvement slowed, although manufacturing productivity performed better. Manufacturing productivity increased by an annual average of 2.4% in the 1970s and 2.8% in the 1980s. By contrast, the productivity performance of total nonfarm business gained 1.9% annually in the 1970s and 1.4% in the 1980s. By the 1990s, manufacturing output per person-hour increased twice as fast as total nonfarm productivity, 4.0% to 2.0%.[19] While manufacturing output declined by an average

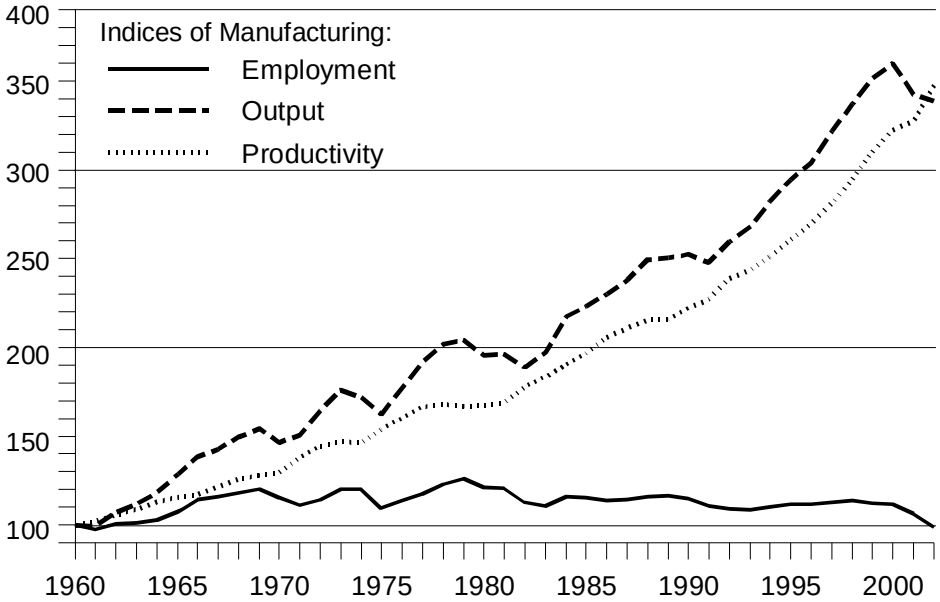
[18] These causes are listed and discussed in *ibid*., pp. 19-21.

[19] "Output per person-hour" or "output per hour" is the traditional measure of labor (continued...)

of 3% per year in 2000-02, hourly output per employee increased by an average of 3.3% per year, a level that nearly equals the performance of all nonfarm business. These strong productivity numbers help explain why U.S. manufacturing has been able to maintain high levels of output with a declining employment base.[20]

Figure 4 summarizes the data related to manufacturing from this section. It compares changes in manufacturing employment, real output and productivity measures since 1960. Employment, output measured in real terms, and output per hour all increased in the 1960s and '70s. However, the trends diverged significantly starting in the 1980s, and more dramatically in the 1990s. From 1960 to 1969, employment grew 20%, productivity by nearly 30% and total real manufacturing output by more than 50%. Despite a major recession in the middle of the decade, employment continued to grow in the 1970s, reaching its all-time peak in 1979, more than 25% higher than the 1960 level, while productivity was two-thirds higher and total output more than double the level of 1960. To this point, the gains in the three measures were synchronous, if not completely parallel.

Figure 4. Manufacturing Employment, Output and Labor Productivity



Source: U.S. Department of Labor. Bureau of Labor Statistics. "National Employment, Hours and Earnings," Employment in Manufacturing, viewed on September 15, 2003; "Major Sector Productivity and Costs Index," Output in Mfg and Output per Hour in Mfg., viewed September 16-17, 2003. All data from www.bls.gov

But employment never regained the 1979 peak in the 1980s, and ended the decade only 15% higher than in 1960. Productivity and real output both continued to grow. After the recession of 1991, manufacturing employment grew marginally until 1998, then began falling — ending in 2002 at a lower absolute level than in

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[19] (...continued)
productivity in the economy. Hereafter, this report will use the shorter term.

[20] *Manufacturing in America* on this point summarizes, "Because productivity gains in manufacturing have outstripped the growth in demand for manufactured goods, manufacturing employment has been falling for the past three decades;" see pp. 17-18.

1960. Labor productivity during the same period accelerated to reach nearly 3.5 times the rate of 1960, and continued to improve during the period of recession and slow growth in 2001-02. The real value of total manufacturing output in 2002 was also about 3.5 times the 1960 level, despite a dip in 2001. These data suggest a long-term trend growth in real manufacturing output, driven by improved productivity, and that the decline in output in 2000-2 was only cyclical in nature.

Thus far, the analysis has dealt with U.S. "manufacturing" as a single, undifferentiated sector. But, of course, a wide range of products and processes are covered by the term, however it may be defined. The next sections of the report examine divergences of performance within the manufacturing sector, and look in more detail at selected specific industries.

Before examining these divergent trends, the report will look briefly at one more topic that affects manufacturing across the board, unionization. Manufacturing has traditionally been one of the most highly unionized ("organized" in labor union terms) sectors of the U.S. economy. The decline of the share of workers in manufacturing jobs has thus contributed to the widely noted decline of union membership within the total workforce. By 2004, 12.5% of all wage and salary workers in the United States were union members, the lowest percentage since this statistical series was begun by BLS on its current basis in 1983, when the level was 20.1%. Within manufacturing, however, union membership rates have fallen even more precipitously. It was 27.8% when the series began in 1983, and declined to 14.3% in 2002, barely more than half the earlier level — and only one point higher than the overall average of the total workforce. Manufacturing remains one of the more highly unionized sectors in the private sector economy, with only construction, and transportation and public utilities ranking higher, though both have also registered large declines over the past 20 years (by contrast, government employees have maintained a relatively high and stable level of union representation, at just under 40% throughout the period).[21]

Performance Varies Widely by Industry[22]

While analysis of the overall manufacturing sector in relation to the economy as a whole is instructive, examination of trends of individual industries within the sector can provide further insight. Different industries experienced considerable variations in output growth, productivity gains, employment ups and downs; and patterns of change over time. Moreover, instances of similar growth rates or patterns may be due to different causes.

This section describes and analyzes the increases and/or decreases over two discrete periods in output, labor productivity, and employment observed for the "two-digit" industries that comprise the manufacturing sector under the Standard Industrial

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[21] BLS. "Union Members in 2004," annual press release and table (Jan. 27, 2005), and unpublished time series from Current Population Survey.

[22] This section was written by Bernard A. Gelb.

Classification system (SIC).[23] The two-digit level is the first level of disaggregation "below" that of manufacturing as a whole, containing a diversity of "sub-industries" in many cases. It is used in this report because BLS does not have output and productivity data for years prior to 1987 at a more disaggregated level.

The analysis is based upon indexes of real output and output per hour developed by BLS, and the BLS's employment by industry data. The periods covered are 1960 to 1990 and 1990 to 2000. The earlier period begins sufficiently later than the end of World War II so as not to be significantly affected by that war, and is long enough to capture secular trends. The latter period includes the unusually strong economic years of the second half of the 1990s. For reasons of comparability, the analysis is on a "peak-to-peak" basis; 1960, 1990 and 2000 are each a final year of an economic expansion, as measured by annual totals of real GDP.[24]

This section of the report does not attempt to analyze trends in every individual industry. This is partly because trends at the two-digit level are a composite of developments in the sub-industries, which would necessitate analysis of each of the sub-industries. Trends in information technology industries, in motor vehicle manufacturing, and in textile and apparel manufacturing are examined in greater detail later in this report under "Selected Major Industries."

Output Trends

Perhaps the most striking findings of this analysis are the degrees of divergences among rates of output growth by individual industries, and between those of individual industries and that for manufacturing as a whole. One of the notable aspects of this is the lack of concentration around an average rate of output growth for all manufacturing.

The disparities that will be described reflect industries' production method(s), places in the chain of production, access to material inputs, product mix, distance from markets, growth of market, technology level, rate of innovation, and degree of exposure to foreign competition. And these aspects affect and are affected by the evolution of the economy toward a smaller proportion of goods production being accounted for by basic materials. Because the two-digit level is fairly aggregated, analysis with respect to these factors can be clouded by differences in production processes, product type and product technology level among parts of an "industry."

As indicated in the first part of this report, real output by the manufacturing sector increased at an average annual rate of 3.1% per year between 1960 and 1990. However, only six of the 18 two-digit manufacturing industries for which BLS has

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[23] Although no longer used for data collection and compiling, the SIC system is used here because output, productivity, and employment data developed by the Bureau of Labor Statistics on the new North American Industrial Classification System are not yet available for years preceding 1987. See the Appendix to this report for further discussion of the change to the new system.

[24] CRS believes that an annual, rather than a monthly, criterion for determining business cycle peaks is the appropriate one for this report, inasmuch as the analysis uses annual data.

developed indexes of output had rates of growth during this period within 20% of that for manufacturing as a whole; five had growth rates 40% or more below that of manufacturing as a whole; and four had growth rates 40% or more above that of manufacturing. For the 1990-2000 period, only three industries had growth rates within 20% of that of manufacturing as whole; ten had growth rates 40% or more below that for total manufacturing; and two had growth rates two and a half to four times as fast as that for manufacturing as a whole.[25] These two industries are the very large machinery manufacturing groups, which notably include information technology and electronic products. (See Table 1 for the data underlying this paragraph and most of the rest of this section.)

1960 to 1990. In view of the factors listed above, it is not surprising that output by the primary metals industry grew very slowly between 1960 and 1990, as U.S. metal ore reserves became depleted and world production of primary materials using energy-intensive processes tended to shift overseas, partly attracted by lower energy costs abroad. Output by stone, clay, and glass manufacturers increased much faster than that by primary metals producers even though they, too, produce basic materials using energy-intensive processes. Losses by U.S. producers of stone, clay and glass manufactures to overseas producers probably were limited partly due to the low average unit value of some products, combined with the difficulty of transporting many others, and the availability of these common materials close to their markets. This raises the cost of transportation relative to production cost and limits the geographic size of the market. Both industries' output grew much slower than the all-manufacturing average.

Industries with very rapid output growth between 1960 and 1990 include rubber and plastic products, chemicals and allied products, industrial and commercial machinery (including computers),[26] electronic and other electrical equipment, and instruments and related products. These industries are adept at innovation: entire or large parts of these industries employ a high level of technology and/or employ material inputs that are easily modified and/or combined to develop new products. And, in many cases, their products substitute easily for higher value materials. Over the 30-year period, these industries' output rose at average annual rates between 4.0% and 5.8%.

Industries with growth of about the same rate as total manufacturing in the 1960-1990 period include lumber and wood products, furniture and fixtures, paper and allied products, and printing and publishing. The markets for goods that these industries produce are predominantly linked to general economic and income growth. While part of the paper industry performs energy-intensive basic material processing, most of the value added in the two-digit industry is accounted for by the entities that "convert" — through coating, cutting, forming, etc. — raw paper and paperboard into

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[25] Given the 1960-1990 average annual output increase of 3.1% for total manufacturing, an industry would be within 20% if its average increase was between 2.4% (0.8 x 3.1) and 3.7% (1.2 x 3.1).

[26] Computers and computer equipment were classified in this two-digit industry under the SIC. Computer components were classified under Electronic and Other Electrical Equipment and Components

the wide variety of paper and paperboard products used by businesses and households. In the case of lumber and wood products, a big part of demand growth stemmed from rising incomes that spurred a marked increase in the size of new homes constructed, rather than by an increase in the number of homes built.

1990 to 2000. Between 1990 and 2000, output developments for most individual industries were markedly different than their 1960-1990 experience. One aspect is that divergences in production growth rates among individual industries, when compared with the average for manufacturing as a whole, were even greater in the 1990-2000 period than between 1960 and 1990. In the later period, only three of the 18 two-digit manufacturing industries had rates of growth within 20% of that for manufacturing as a whole (compared with six in the earlier period).

A second aspect is the difference between the growth rates of the individual industries in the two periods. Production increases for the two fastest growing industries (industrial and commercial equipment, electronic and other electrical equipment) accelerated from their already rapid increases, as computerization and telecommunication usage by businesses and households mushroomed, helped by continuing product innovation. These industries' average annual output growth rates jumped from 5.1% and 5.8% to 9.0% and 14.3%, respectively. Output by the "sub-industry" making computers and computer equipment rose at an average annual rate of 29% between 1990 and 2000.

The slowest-growing industry in terms of output in 1960-1990 experienced faster growth in 1990-2000, although not up to the all-manufacturing average. Primary metals benefitted from modernization of the integrated mill portion of the steel industry, accelerated increase in market share produced by steel minimills, and computerization of the machine tools used by the fabricated metals industry.

Among industries that saw output growth slow in the 1990-2000 period were paper and allied products, chemicals and allied products, and printing and publishing. All three had been growing as fast as or faster than the all-manufacturing average. The first two decelerated partly because imports started to make noticeable inroads into domestic markets, in contrast with the earlier period. The third suffered from the widespread penetration of in-house computer-enabled printing.

The 1990-2000 period also was characterized by the fact that twice as many individual industries experienced slower output growth compared with 1960-1990 than industries that had faster output growth compared with 1960-1990. That *total* manufacturing production rose faster between 1990 and 2000 than between 1960 and 1990 is because the industries with faster output growth were large enough and their output increases were rapid enough to more than offset the slow production growth of the other industries.

Productivity Trends

Trends in labor productivity among manufacturing industries in the two periods covered in this report were at least as complex and diverse as the output trends, although there was somewhat more concentration of rates of gain in the 1960-1990 period. Divergences in rates of gain in output per hour in the 1960-1990 period

among individual industries were less extensive than those for output, described earlier. Nine of the 18 two-digit manufacturing industries had rates of increase in output per hour within 20% of the annual average for manufacturing as a whole (2.7% per year); four had growth rates 40% or more higher than that of manufacturing as a whole; and two had growth rates 40% below that of manufacturing. But the disparities were greater in the 1990-2000 period, during which only three industries had growth rates within 20% of the all manufacturing average (3.8% per year); eight had growth rates 40% or more below that for total manufacturing; but two had growth rates two and a half to four times as fast as that for manufacturing as a whole.

Table 1. Trends in Output, Labor Productivity, and Employment in Manufacturing Industries: 1960-1990, 1990-2000

Industry	Output		Output per Hour		Employment (thousands)		
	Average Annual % Change						
	'60-'90	'90-'00	'60-'90	'90-'00	1960	1990	2000
Total manufacturing	3.1	3.6	2.7	3.8	15,438	17,695	17,263
Food & kindred products	2.2	1.8	2.5	1.5	1,790	1,661	1,687
Textile mill products	3.2	1.0	4.2	3.6	924	691	531
Apparel, other fabricated textile products	1.8	1.6	2.4	6.6	1,233	1,036	634
Lumber & wood products	3.0	1.1	2.7	- 0.2	670	733	830
Furniture & fixtures	2.8	3.9	1.8	2.7	365	506	556
Paper & allied products	3.3	1.5	2.8	2.2	597	697	656
Printing & publishing	3.0	0.5	1.1	0.7	911	1,569	1,547
Chemicals, allied products	4.0	2.2	3.1	2.6	828	1,086	1,034
Petroleum & coal products	1.9	1.2	2.7	3.6	212	157	127
Rubber & miscellaneous plastic products	4.9	4.8	2.3	3.4	413	888	1,011
Stone, clay, glass, concrete	1.6	1.2	1.7	1.6	572	556	579
Primary metals	0.5	1.7	1.8	2.0	1,185	756	699
Fabricated metal products	1.9	3.2	1.5	2.1	1,230	1,419	1,539
Industrial & commercial machinery, computers[1]	5.1	9.0	3.9	8.9	1,496	2,095	2,121
Electronic & other electrical equipment[2]	5.8	14.3	4.7	14.0	1,221	1,673	1,726
Transportation equipment	3.0	3.6	2.4	4.0	1,668	1,989	1,852
Instruments, related products	5.6	2.7	4.0	4.2	632	1,006	845
Miscellaneous mfg.	3.3	2.4	2.3	2.1	390	375	392

[1] Includes computer equipment. [2] Includes communication equipment.

Source: Data in this table were derived from the following BLS sets of data: "Major Sector Productivity and Costs Index" series, "Major Sector Multifactor Productivity Index" series, and "National Employment, Hours, and Earnings" series.

The fairly high level of aggregation at the two-digit level combined with considerable heterogeneity in some cases makes the challenge of explaining rates of gain in productivity and changes in those rates over time particularly great for industries such as transportation equipment, electronic and other electric equipment, and rubber and miscellaneous plastic products.[27] For example, in addition to motor vehicles, products of the transportation equipment industry include guided missiles and space vehicles, travel trailers and campers, and motorcycles and bicycles, among others. And among the products of the electronic and other electric equipment industry are electric distribution equipment such as transformers and switch gear, household refrigerators and freezers, and electronic components and accessories such as semiconductors and printed circuit boards.[28]

1960 to 1990. Probably indicating a connection between productivity improvement and commercial success,[29] the industries with the highest rates of increase in output per hour between 1960 and 1990 by and large are those with the fastest output growth. These industries included chemicals and allied products, industrial and commercial machinery, electronic and other electrical equipment, and instruments and related products, with average annual rates of gain in productivity of 3.1%, 3.9%, 4.7%, and 4.0%, respectively. Manufacturing as a whole had an average annual gain of 2.7%. One of the attributes of rapid output growth is that the need for additional production capacity presents more opportunities for the introduction of state-of- the- art production facilities and new production processes than in the case of less rapidly growing industries. At least parts of the industries cited above are characterized by rapid technological innovation, which tends to create new products faster and generates increased demand.

Correspondingly, if the above assumption about a connection between productivity improvement and commercial success is valid, it is not surprising that four out of the five industries with the slowest gains in productivity (furniture and fixtures; stone, clay, and glass; primary metals, and fabricated metal products) had slower than average rates of increase in output during the 1960-1990 period. Industries with average rates of increase in both output per hour and production in the 1960-1990 period were lumber and wood products, paper and allied products, and transportation equipment. Demand for the products of these seven slow- or average-growing industries tends to be related to general economic growth and/or population growth. Less rapid output increase affords fewer opportunities for the introduction of state-of-the-art production facilities and processes.

1990 to 2000. Between 1990 and 2000, productivity developments for most individual industries were markedly different than their 1960-1990 experience — similar to the changes in output. As noted above, divergences in output per hour increase among industries were even greater in the 1990-2000 period than between

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[27] The same comment holds for analyses of production increases.

[28] Such groupings have evolved from industrial classification concepts of several decades ago, when the nature and range of products and production processes were considerably different.

[29] A suggestion of "connection" does not imply 100% predictability.

1960 and 1990. Also, productivity growth rates of the individual industries differed markedly in the two periods.

In the 1990-2000 period, the rise in output per hour of the two fastest growing industries (industrial and commercial machinery, electronic and other electrical equipment) accelerated sharply from their already rapid 1960-1990 increases — from 3.9% and 4.7% to 8.9% and 14.0%, respectively. Productivity of the "sub-industry" making computers and computer equipment rose at an average annual rate of 32% between 1990 and 2000. The extraordinary gains of the above-mentioned two-digit industries and marked improvement by several others offset the slower than average productivity gains by nine other industries.

The "several others" were apparel, furniture, petroleum and coal products,[30] rubber and miscellaneous plastic products, and transportation equipment. Eight of the nine industries with slower gains in output per hour in the1990-2000 period than in 1960-1990 had average annual increases of 2.5% or less. These were food and kindred products, lumber and wood products, paper and allied products, printing and publishing, stone-clay-glass, primary metals, fabricated metal products, and miscellaneous manufacturing.

Employment Trends

As discussed in the section on the manufacturing sector as a whole, the trend (though not the level) in employment in an industry to a great extent is an outcome of changes in the industry's production level combined with changes in labor productivity in the industry. Given the diversity of trends in production and in labor productivity among the two-digit industries, it is not unexpected that trends in employment among the industries were diverse as well during the two periods examined. Only four of the 18 two-digit manufacturing industries had percentage changes in employment between 1960 and 1990 within 10 percentage points of the increase for manufacturing as a whole (14.6%), whereas 11 industries had employment percentage changes 20 points or more higher or lower than the percentage change for manufacturing as a whole. Taking into account that 1990 to 2000 was one third as long as 1960 to 1990, the disparities appear greater in the 1990-2000 period: only two industries had percentage changes within three percentage points of the all manufacturing average (-2.5%); and ten had changes 20 percentage points or more higher or lower than the percentage change for total manufacturing.

1960 to 1990. Employment in the manufacturing sector as a whole increased by about 3¼ million people between 1960 and 1990. But, as can be concluded from the data on divergences in the previous paragraph, the gain in overall sector employment is the net result of many increases and decreases in absolute numbers among the individual industries. Not surprisingly, the largest absolute increases tended to occur in large rapidly growing industries. Thus, the industrial and commercial machinery, electronic and other electrical equipment, rubber and miscellaneous plastic products, and instruments and related industries experienced

[30] Petroleum refining accounts for about 90% of the output of this two-digit industry.

gains in employment of 600,000, 450,000, 475,000, and 470,000, respectively. But two not particularly fast-growing industries, printing and publishing and transportation equipment, registered employment increases of about 640,000 and 320,000, respectively.

Offsetting part of these large increases plus several smaller ones, were declines in employment of varying magnitudes in seven other industries between 1960 and 1990. These include a 430,000 decrease in primary metals and a 130,000 decrease in food and kindred products, in addition to employment decreases totaling 430,000 in the textile mill and the apparel industries (discussed later).

1990 to 2000. Given the fact that the 1960-1990 period was much longer than the 1990-2000 period, the amounts of employment decreases and increases in individual industries in the later period would be expected to be smaller. This was the case. The largest decrease was that of 400,000 in apparel manufacturing, where very rapid productivity increases (averaging 6.6% per year) and import competition probably were factors. Drops of 160,000 were experienced both by textile mills and by the instruments industry, and there was a 135,000 employment decrease in the transportation equipment industry. The otherwise fast-growing instruments industry was hit by a sharp decrease in defense spending on search and navigation equipment. As for transportation equipment, employment losses in aircraft and parts more than offset gains in motor vehicles and equipment, which will be discussed in a later section. The total of the deceases in these industries was about 850,000; miscellaneous others saw employment drop a combined 280,000. Increases of 120,000, 120,000, and 100,000 in employment in the rubber and plastics, fabricated metals, and lumber and wood products industries, respectively, plus a number of small increases in employment among other industries offset some of the total decreases to yield an employment decline of about 430,000 in the manufacturing sector as a whole.[31]

From examination of trends in output, labor productivity, and employment of individual manufacturing industries, it appears that, notwithstanding their commonalities, they differ sufficiently in many characteristics and in the markets they serve. Therefore, they experience vastly different outcomes over the course of time.

Performance of Selected Major Industrial Sectors

Having noted a wide divergence of performance among different sectors of the U.S. manufacturing economy, this report will now investigate three important sectors in more detail. The three specific sectors selected are all important to the overall U.S. economy, in terms of output and employment, and epitomize the divergence of experiences within U.S. manufacturing.

- Information technology (including especially computers, communications equipment and semiconductor components) was a

[31] The employment decrease and increase figures in this discussion of employment trends are based upon unrounded numbers for the beginning and ending years of the two periods.

high-growth area of the economy in the 1990s, and has remained internationally competitive.

- The U.S. automotive sector, which has historically expanded more by investment abroad than by exports, faced increasing pressure from imports in the 1980s. Now many foreign-based manufacturers have manufacturing operations in the United States, leaving an industry notably divided between the traditional "Big Three" (including one now foreign-owned company) and automobile manufacturers that were originally internationally based.
- Textiles and apparel are traditional U.S. industries that have been struggling to compete against imports. Their output growth slowed and employment fell in the 1990s, despite a strong overall economy. Now they face the challenge of the elimination on January 1, 2005 of the remaining import quotas.

Information Technology Industries[32]

Decline in Information Technology Industries. Information technology (IT) industries led U.S. economic growth in the 1990s, but their decline was a major cause of recession in 2001. Afterwards, the IT sectors have lagged the economy, rather than leading it, though by 2003 it had begun growing again.[33] From the perspective of the industrial economy and IT businesses, the recession hit hardest at manufactured hardware, particularly in low levels of demand for computers and telecommunications equipment in which semiconductors are the key component. This section will focus particularly on trends affecting these product groups.

Figure 5 shows the strong growth especially of business investment in the two largest product groups that are intensive users of semiconductors, computers and communications equipment, for most of the period following the recession of the early 1990s. The annual value of private business investment in computers and peripherals more than doubled from $44 billion to $101 billion between 1992 and 2000. Communications equipment purchases by business increased at an even faster pace, from $46 billion to $124 billion. Together with software, these items accounted for about 50% of the entire increase in U.S. business equipment investment in the 1990s. If we refer to the inflation-corrected values reported by the Commerce Department Bureau of Economic Analysis (BEA), information-processing equipment and software accounted for 68% of the total real increase in business investment between 1992 and 2000, and nearly 20% of all real U.S. growth. However, BEA cautions that the inflation-corrected estimates are questionable

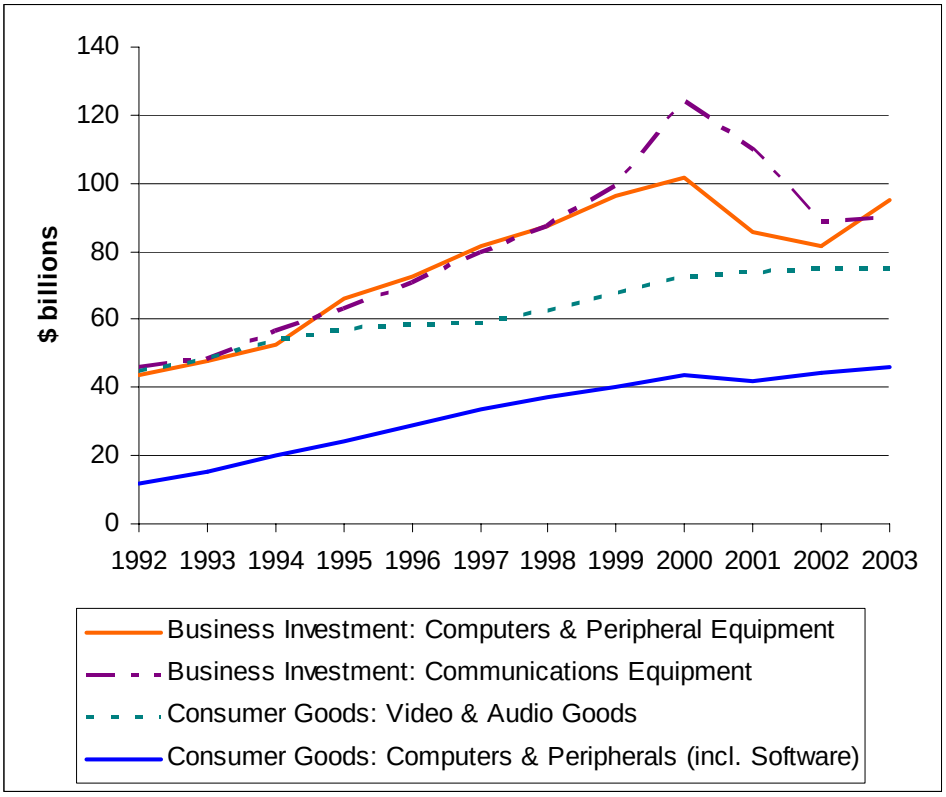
[32] This subsection was written by Stephen Cooney.

[33] Tom Runiewicz argued that "high tech" again led the recovery for two reasons: the "short life cycle for computers and related equipment" as systems ordered for Y2K became outdated, and corporations look at IT systems as a quick way to boost productivity, as the economy recovers; *Global Insight: Perspectives*, viewed online Nov. 18, 2003.

because prices for computing power and performance have been changing so rapidly.[34]

The rapid rate of growth in the capital-goods end markets for IT products reversed sharply in 2001. As clearly shown in **Figure 5**, business demand for computers and communications equipment fell by a combined total of $30 billion. Consumer demand for computers, mostly PCs for home use, held up better than business investment, falling only marginally, but this is a much smaller market, less than $50 billion per year, including software. Also displayed in Figure 5 is consumer demand for video and audio equipment, a broader consumer market of more than $70 billion, but less intensive in its use of semiconductors and other IT inputs; also, many of these types of products are imported. The market for these consumer products did not grow as strongly after 2001, but it never seriously declined. In 2002, business and consumer demand for computers stabilized in dollar value, but business investment in communications equipment fell again, from $110 billion to $89 billion. However, business investment and consumer purchases of computers, as well as business investment in communications equipment, turned up in 2003, suggesting that IT products contributed a stronger economic recovery.

Figure 5. U.S. Information Technology Market Change



Source: U.S. Dept. of Commerce. Bureau of Economic Analysis. *National Income and Product Accounts*, Tables 2.4.5 and 5.5.5 (August 2004).

[34] BEA. NIPA Table 5.9, published August 2002, fn. 1 states, "because of rapid changes in relative prices, the [real] estimates for computers are especially misleading as a measure of the contribution or relative importance of this component."

Semiconductors Bolster U.S. International IT Competitiveness. The IT industry is a global industry, with respect not only to sourcing but also to standards and applications. The relative international competitiveness of U.S. IT equipment manufacturing sectors, widely considered as "sunrise" industries, has become an issue for the U.S. employment and manufacturing base. With slow or unsteady growth in markets outside the United States, there has also been a negative impact on U.S. exports, including IT products.

Semiconductors are the key IT product in which there is a U.S. comparative advantage. The United States has recovered the overall technological and competitive leadership position in semiconductors, which it once was in danger of losing, in terms of dollar value of products sold by U.S. companies. U.S. companies had lost their initial preeminence in the global market to Japanese companies by the mid-1980s. When U.S. industry threatened a massive antidumping case against Japanese producers, the Reagan Administration negotiated the U.S.-Japan Semiconductor Agreement of 1986. The Japanese industry and government agreed to accept as a target a minimum penetration level of 30% of its market from all foreign-owned companies, along with a monitoring mechanism.[35] A second initiative was establishment of a private-public consortium between the federal government and U.S.-based semiconductor and manufacturing industry producers, known as "SEMATECH" (for Semiconductor Manufacturing Technology). In addition, macroeconomic factors favored U.S. producers. The fall in the dollar exchange rate, as noted elsewhere in this report, helped U.S.-based producers regain their market competitiveness, while slow domestic growth in Japan in the 1990s held down demand in Japanese producers' home market.

Subsequently, U.S. companies recovered overall dominance of the world semiconductor industry. In 1988-89 Japanese manufacturers held more than 50% of the global semiconductor market, the only time they have done so. At that point, Japan's companies controlled 88% of their domestic market, about 35% of the market elsewhere in Asia and the Pacific, and more than a quarter of the U.S. domestic market. Because of the opening of Japan's own market, prodded by careful monitoring of the Semiconductor Agreement in the early 1990s, Japanese companies' share of their domestic market declined to a consistent level of about 70% in the late 1990s. U.S. companies' share increased from 13% to 23% of the Japanese market over the same period.[36] Meanwhile, by 2001, the Japanese share of the U.S. market, declined by half to 11%, while the U.S. companies' share was greater than 70%. Japanese producers share of the Asia-Pacific market outside Japan fell by half, to less than 19%, while U.S. companies held more than 50% of that market. In Europe,

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[35] The history of this agreement is reviewed in CRS Report 96-486, *The U.S.-Japan Semiconductor Agreement: Should It Be Renewed?* by William H. Cooper (May 30, 1996). For an account from the perspective of a U.S. negotiator, see Clyde V. Prestowitz, Jr., *Trading Places* (New York: Basic Books, 1988), ch. 2.

[36] All regional figures are from Semiconductor Industry Association (SIA), World Semiconductor Statistics, as cited in CRS Report RL31708, *Semiconductors: The High-Technology Downturn and Issues in the 108th Congress*. The market share figures are counted according to the home country of companies, regardless where the semiconductors were manufactured.

where Japanese companies never have gained a large share of the market, their role declined to 14%, while U.S.-based companies again had more than 50% of the market.[37]

U.S. exports and world trade in IT products were encouraged further by the Information Technology Agreement (ITA), negotiated in 1996. Most of the countries that produce IT equipment agreed to eliminate all tariffs on such products and components, including computers, telecommunications equipment and semiconductors (but not consumer electronics). There were originally 43 signatory countries, which accounted for more than 90% of all trade in IT products; the total value of trade covered in the original agreement was more than $650 billion. For the United States and Japan, signature of the ITA in principle involved relatively little change, since neither country had a tariff on semiconductors, and most other electronics tariffs were minimal. The European Union eliminated its substantial tariffs on semiconductors and other electronic products, while China and India both joined the agreement, after negotiating transitional "staging" periods.[38] The major trading countries not included in the ITA bloc are the nations of Latin America, notably Brazil, Argentina and Mexico. Though U.S. chip exporters have free access to Mexico through NAFTA, Mexico still applies tariffs to chips imported from non-free-trade partner countries.

With rapid economic growth, renewed U.S. industry competitiveness and a more open global trade environment, both U.S. exports and imports of most IT products grew rapidly in the 1990s, as shown in **Table 2**. But domestic growth was stronger than foreign growth, leading to U.S. imports increasing at a higher rate than exports. This was especially the case for computer peripherals, which the United States has always tended to import. Also, the table shows that U.S. computer exports increased only marginally in the 1990s, an indication that the U.S. comparative advantage is in semiconductors, the memory and logic of IT products. But the comparative advantage in semiconductors has been so strong that even with increased global two-way sourcing, the U.S. trade surplus in these products grew along with increased domestic growth and trade, and at least partially offset the deficit in peripherals. As exports grew from $16 billion to $60 billion between 1992 and 2000, the U.S. trade position in semiconductors changed from a balanced position to a U.S. surplus of $12 billion. Moreover, the United States maintained a balanced status in trade in communications equipment.

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[37] It is possible that some of this market-share gain in the Asia-Pacific region was due to increased outsourcing by U.S. companies of printed circuit board assembly operations, relative to similar activities by Japanese companies. But the sizes of overall gains of U.S. companies against Japanese companies in all markets make it unlikely that this is solely an aspect of U.S. outsourcing.

[38] See CRS Report 98-376, *The Information Technology Agreement (ITA): Background on a Proposal to Expand the Scope of the Multilateral Trade Agreement*, by Glennon J. Harrison.

Table 2. U.S. Trade in Information Technology Products

(All figures in billions of dollars)

	1992			2000			2001			2002		
	X	M	Bal	X	M	Bal	X	M	Bal	X	M	Bal
Semi-conductors	16	16	0	60	48	12	45	30	15	42	26	16
Computers	9	5	4	11	14	-3	11	13	-2	9	16	-7
Computer Access.	20	27	-7	44	76	-32	37	61	-24	29	59	-30
Telecom. Equipment	12	11	1	31	33	-2	28	25	3	22	23	-1

X = exports; M = imports.
Source: Department of Commerce. Bureau of the Census, Foreign Trade Division. *U.S. International Trade in Goods and Services* (FT900), "Annual Revisions" for 1993, 2001 and 2002, Exhibits 6-7 (www.census.gov/foreign-trade/Press-Release).

The bottom fell out of the global semiconductor business in 2001. Total worldwide sales fell from more than $200 billion to about $140 billion in 2001 and 2002, though stronger growth has recently been reported.[39] The surplus in semiconductors marginally increased in 2001-02, however, even though semiconductor exports fell to $42 billion. The picture for computers was not so positive. After a decade of roughly balanced trade, imports of computers nearly doubled exports in 2002: $16 billion to $9 billion. After 2000, telecommunications equipment trade has roughly stayed in balance, as exports and imports have fallen proportionately.

IT Manufacturing Employment. The employment impact of these trade and product demand developments in general mirrors that discussed earlier regarding manufacturing employment in general. In 1990, 1.9 million people were employed in manufacturing computer and electronic products, which includes all the product groups discussed here, plus other electronic products such as instruments and medical equipment. Despite the sector's strong contribution to U.S. growth, employment hit a plateau of about 1.7-1.8 million in the late 1990s through 2000. Afterwards, the employment level dropped dramatically, reaching an annual rate of 1.5 million reported for 2002, and a 2003 total of less than 1.4 million.

About one-third of the employment in this sector is in semiconductors and other electronic components, where the number increased from 574,000 in 1990 to a peak of 676,000 ten years later, then fell to 525,000 in 2002, and 461,000 in 2003.

[39] SIA. World Semiconductor Statistics, "World Semiconductor Shipments." For the 2003 upturn, see SIA press release, "Global Chip Sales Reach $13.42 Billion in August 2003," which noted that this improvement was the sixth consecutive monthly increase.

Employment rose in communications equipment at a slower rate in the 1990s, peaking at 247,000 in 2000, but had fallen to 191,000 in 2002. Employment in manufacturing computers in the 1990s never reached the 1990 level of 367,000; it peaked at 322,000 in 1998, and had fallen to 249,000 by 2002 with the industry downturn. Instruments and other electronic products recorded a major and steady loss of employment right through the decade, from 626,000 in 1990, through the 500,000 level in 1998, to 478,000 by 2000 and 450,000 in 2002 — a nearly 30% fall in employment. Altogether, despite the high growth in IT's role in the U.S. economy and the robust international competitive position of the U.S. industry, employment gains were absent or relatively modest, and disappeared with the onset of the recession in 2001.

The emergence of China as both a large market and a major producer of electronics could also significantly alter the conditions for technology dominance and site selection for chip manufacturing locations. Already, the development of China as a major market helps explain why chip sales in Asia and the Pacific (outside Japan) increased by almost 30% in 2002, when they declined everywhere else.[40] In 2000, according to SIA figures, the "Americas" region (comprising the entire Western Hemisphere, but dominated by the U.S. market) represented the world's leading market region for semiconductor shipments: $64 billion, or almost a third of the global total. By 2002, Asia-Pacific (ex-Japan), with $51 billion in shipments accounted for more than one-third of the global total, $20 billion ahead of the Americas. By 2006, SIA forecast that Asia-Pacific will account for more than 40% of semiconductor shipments, and Japan, which is already recovering due to aggressive efforts of its companies to sell into China, is projected to move into second place.[41]

One aspect of China's rapid integration into the world economy is that Chinese production may create permanent downward pressure on prices, because of its virtually inexhaustible supply of low-cost labor. This phenomenon may especially affect pricing for those electronics products and components, such as consumer electronics and printed circuit boards, where labor cost is critical. There is also some question as to whether China will ever be a net exporter of semiconductors, especially the more sophisticated variety, in the foreseeable future.[42]

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[40] SIA. "World Market Shares, 1991-2001," as updated for 2002 final data (provided courtesy of SIA). *Business Week* has particularly focused on the phenomenon of Chinese development, as in "High Tech in China: Is It a Threat to Silicon Valley?" (Oct. 28, 2002) and "Greater China" (Dec. 9, 2002). See also *Electronic News*, "China Gains as U.S. Economy Struggles,"(Sept. 23, 2002).

[41] "SIA Projects Robust Growth for Semiconductor Industry," released Nov. 5, 2003 on its website, [http://www.semichips.org]. The Japanese newspaper *Mainichi Shimbun* has claimed that global industry monitoring data (World Semiconductor Trade Statistics) will show that Japan will again overtake the United States in total semiconductor shipments in 2003; noted in *Dow Jones International News*, "Japan to Top US in 2003 Chip Shipments," (Sept. 28, 2003).

[42] *Business Week*, "How Low Can Prices Go?" (Dec. 2, 2002); Robert Samuelson, "Deflation Out of China?" in *Washington Post* (Dec. 4, 2002); Dow Jones International (continued...)

Nevertheless, an SIA executive noted that manufacturing and R&D expenditures in his industry tend to follow market location, and believed that the booming market development in China and elsewhere in Asia are challenging for production located in the United States.[43] There was concern, voiced by U.S. trade officials and the industry, that China maintained a discriminatory value-added tax regime that directly promoted domestically manufactured semiconductors against imports.[44] The United States challenged China's policy in a WTO case, and China agreed to eliminate the discriminatory features of its tax policy on semiconductors. A report prepared for SIA maintains that China's increasing capability as a competitor in semiconductor manufacturing is due not to low labor costs, which may be the case for other electronic products, but to tax policies, and other measures to promote local production. China has moved away from reliance on state-owned companies to liberalization of foreign investment inflows, explicit cooperation with Taiwanese-owned companies and adoption of other aspects of Taiwan's high technology development model.[45]

Automobiles and Light Trucks[46]

The U.S. automotive industry is the largest in the world. In 2002, the United States ranked first in vehicle production, with total production of 12.3 million vehicles. Japan ranked second, with a production of 10.2 million vehicles, and Germany third with 5.5 million vehicles. The United States has the largest national market in the world for total vehicle sales. In 2002, the U.S. market, with sales of 16.8 million vehicles, was almost three times larger than the next largest market in Japan.[47] In the 1980s, tensions with Japan over automotive trade led to "voluntary"

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[42] (...continued)
News, "China's Reliance on Chip Imports to Continue, Study Says" (July 24, 2003). See also Economist Intelligence Unit — Business Asia. "Misincentives in China," (October 6, 2003).

[43] He also clarifies that the official SIA numbers may understate the large and growing role of semiconductor foundries, based largely in Taiwan, which produce chips for sale by other companies. Daryl Hatano, SIA. "Fab America — Keeping U.S. Leadership in Semiconductor Technology," presentation May 9, 2003. Market share data from SIA, "World Market Shares 1991-2001" and "Semiconductor Forecast Summary, 2003-2006" (June 2003).

[44] U.S. Trade Representative. *National Trade Estimates Report on Foreign Trade Barriers* (2003), pp. 49, 53-54.

[45] "SIA Report Details Growth of China Chip Industry; Tax on Semiconductor Trade Penalizes Importers, Distorts Investments," *Business Wire* (Oct. 29, 2003). Details are in *China's Emerging Semiconductor Industry*, by Thomas Howell *et al.* of the law firm Dewey Ballantine, for SIA (Oct. 2003), especially ch. 3.

[46] This subsection was written by M. Angeles Villarreal. The data and analysis have been updated and expanded in CRS Report RL32883, *U.S. Automotive Industry: Policy Overview and Recent History*, by Stephen Cooney.

[47] Center for Automotive Research (CAR), *Economic Contribution of the Automotive Industry to the U.S. Economy - An Update*, study prepared for Alliance of Automobile (continued...)

Japanese export restraints negotiated by the Reagan Administration, and later continued unilaterally by the Japanese companies. One result of these voluntary quotas was to encourage the major Japanese companies (Honda, Toyota, Nissan) to invest in automotive manufacturing facilities in the United States, the so-called "transplants." These have been followed by major manufacturing investments by Daimler Benz and BMW of Germany, and by Hyundai of Korea.[48]

The "Big Three" U.S. -based automakers, General Motors Corp. (GM), Ford Motor Co., and Chrysler Group (now a part of DaimlerChrysler AG), together lead the market in U.S. passenger car sales, although their share of the market has declined to less than 50%: 48.4% of U.S. sales in 2002, down from 55% in 2000 and 51.4% in 2001. In light trucks, which include sport utility vehicles (SUVs), the market share of Big Three sales is much higher, but it has also been in decline in recent years. In 2002, the three U.S. automakers accounted for 76.6% of light trucks sold in the United States, down from 79% in 2000 and 77.2% in 2001. The remainder of cars and light trucks sold in the United States were produced by foreign-based companies. Most of these vehicles were produced in transplant facilities.[49]

Production Trends. **Figure 6** shows total motor vehicle production in the United States between 1978 and 2002. In 1978, U.S. motor vehicle production was 12.8 million, but decreased to a low of 7.0 million in 1982. In the early 1990s, motor vehicle production grew considerably, partially due to the strengthening U.S. economy, and also to an increase in light truck production. Production of light trucks increased from 3.7 million in 1990 to 7.1 million in 2002. In comparison, production of cars decreased from 6.1 million in 1990 to 5.0 million in 2002. The Alliance of Automobile Manufacturers[50] gives three factors for the resilience of the U.S. motor vehicle industry after 1990. First, the overall size of the U.S. automotive market was driven by growth in personal income and the formation of U.S. households. Second, auto manufacturers were quick to respond after the events of September 11, 2001 by providing price incentives, which helped sustain motor vehicle demand. Third, automakers have been very responsive to the growing demand for light trucks and SUVs, which comprised almost 59% of U.S. light vehicle production.[51]

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[47] (...continued)
Manufacturers (Fall 2003).

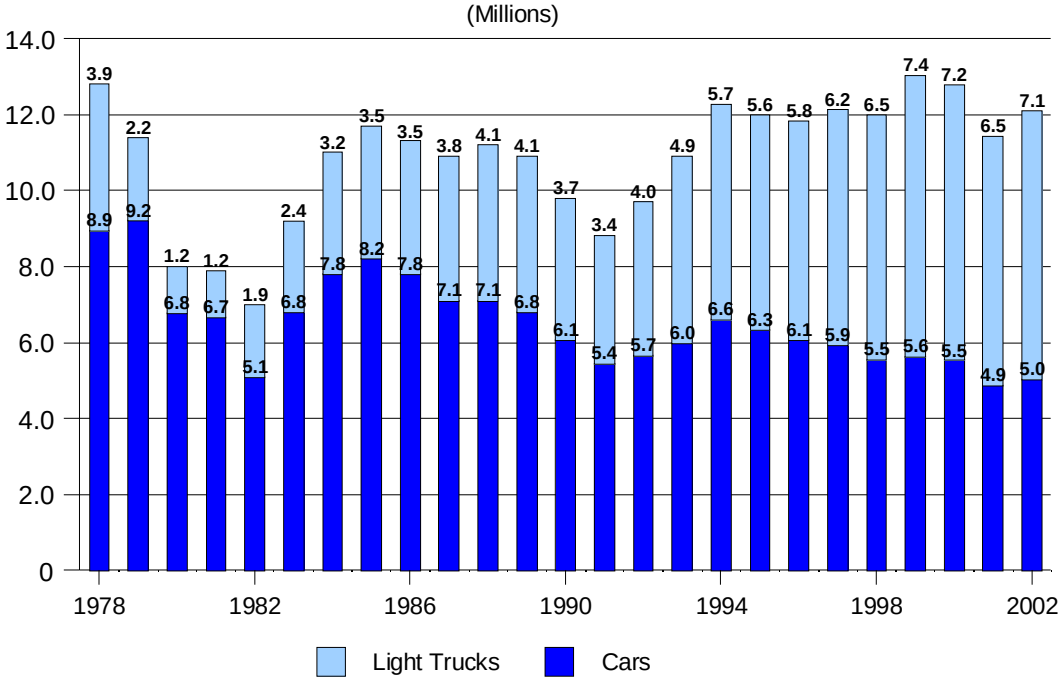
[48] An early "transplant" investment by Volkswagen in New Stanton, Pennsylvania was closed. The Daimler Benz investment in Vance, Alabama, preceded the company's merger with Chrysler.

[49] Standard & Poor's, *Industry Surveys: Autos & Auto Parts*, December 26, 2002.

[50] The Alliance of Automobile Manufacturers is a coalition of 10 car and light truck manufacturers, including BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Nissan, Porsche, Toyota, and Volkswagen.

[51] Study prepared for the Alliance of Automobile Manufacturers, *Economic Contribution of the Automotive Industry to the U.S. Economy — An Update* (Fall 2003), p. 3.

Figure 6. Total U.S. Automobile and Light Truck Production



Sources: Chart prepared by CRS based on data from the following: 1978-1989: *Ward's Automotive Yearbook*, 1989 and 1990; 1990-2002: Alliance of Automobile Manufacturers.

The share of motor vehicles produced by transplant facilities in the United States has increased significantly. Between 1990 and 2002, the share of cars manufactured in the United States by U.S. manufacturers decreased from 78.3% to 63.1%, while that of foreign manufacturers increased from 21.7% to 36.9% (see **Table 3**). The Big Three are still among the top four car manufacturers in the United States, with GM ranking first. In 2002, GM produced 1.7 million cars, and was followed by Ford, with a production of 1.1 million cars; Honda, with a production of 641,000 cars; and the Chrysler Group, with a production of 420,000 cars. In 2003, Honda and Toyota each produced more cars in the United States than did the Chrysler Group of DaimlerChrysler (Honda: 593,000; Toyota: 436,000; and, Chrysler: 363,000).[52] Global Insight, the econometric forecasting firm formerly known as DRI, estimated that U.S. passenger car production by Toyota and Honda would significantly outpace the Chrysler Group output through 2008.[53]

In light truck and sport utility vehicle (SUV) production, foreign producers have also markedly increased their share of total U.S. production. Between 1990 and 2002, their share of light trucks and SUVs manufactured in the United States increased from 5% to 14%. However, the Big Three remain by far the largest producers of light trucks, with GM ranking first. In 2002, GM produced 2.4 million units of light trucks or SUVs, followed by Ford Motor Co., with 2.3 million units; and the Chrysler Group, with 1.3 million units. Of the foreign manufacturers, Toyota ranked first, with a production of 280,848 units in 2002. Nissan, Honda, and the

[52] *Automotive News*, October 13, 2003, p. 42.

[53] Global Insight. *World Car Industry Forecast Report* (September 2003), pp. 200-201.

GM-Toyota joint venture New United Motor Manufacturing, Inc. (NUMMI) each produced more than 100,000 units.

Table 3. Distribution of U.S. Motor Vehicle Production

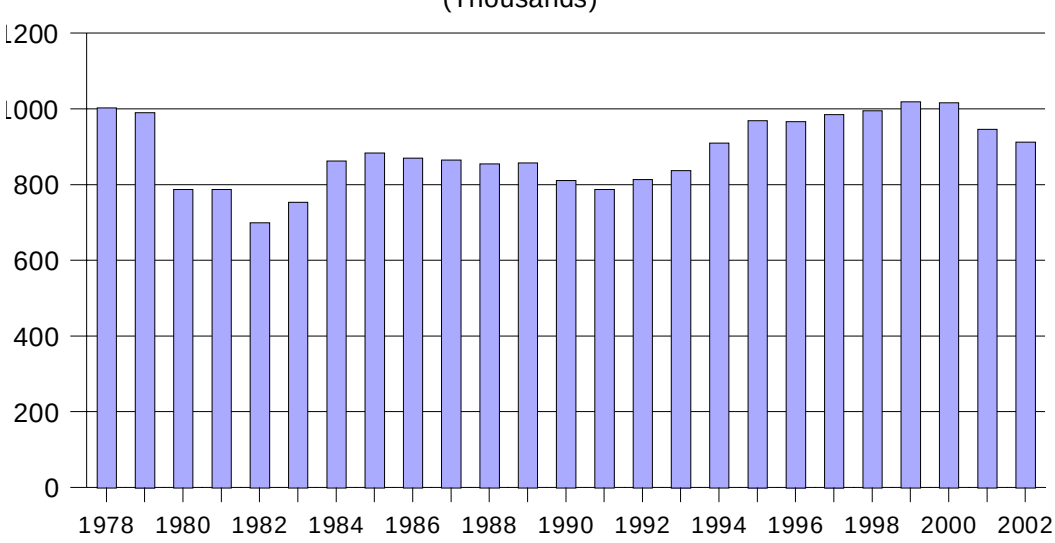
	Car Production				Light Truck/SUV Production			
	1990		2002		1990		2002	
	Units (Mils.)	Share (%)	Units (Mils.)	Share (%)	Units (Mils.)	Share (%)	Units (Mils.)	Share (%)
GM	2.65	43.6	1.67	33.3	1.47	41.3	2.42	34.2
Ford	1.38	22.7	1.07	21.4	1.39	39.0	2.34	33.1
Chrysler[1]	0.73	12.0	0.42	8.4	0.53	14.8	1.33	18.8
Total Big Three	4.76	78.3	3.17	63.1	3.38	95.1	6.09	86.1
Foreign-Based Mfrs.	1.32	21.7	1.85	36.9	0.17	4.9	0.98	13.9
Total U.S. Production	6.08	—	5.02	—	3.55	—	7.07	—

[1]Chrysler Corp. prior to 1999, now Chrysler Group of DaimlerChrysler.

Source: *Ward's Automotive Yearbook*, 2003.

Employment Trends. **Figure 7** shows employment in the motor vehicles and equipment industry from 1978 to 2002, based on BLS data. Unlike the general patterns of employment in manufacturing, peak employment in the auto industry, defined broadly, occurred in 1999, while that in manufacturing occurred in 1979. In 1978, the total number of employees in the auto industry was just over one million. In 1980, the number of jobs in the auto industry decreased considerably due to the 1980 recession. However, during most of the 1990s, employment in the auto sector increased consistently and reached a peak of more than one million jobs in 1999. Since then, employment dropped to 911,000 in 2002.

Figure 7. Employment in Motor Vehicle and Equipment Industry



Source: BLS (SIC Code 371) at www.bls.gov.

Employment indirectly related to automotive manufacturing is much larger. However, the majority of jobs indirectly related to the auto industry are not directly tied to manufacturing. The 2003 study by the Center for Automotive Research cited above found that while the automobile manufacturing was the largest U.S. manufacturing activity, directly accounting for 1.2 million jobs by its estimate, the majority of jobs related to the industry are in supplier and related industries - such as dealerships, auto repair and maintenance, plastics, and rubber, trucking, etc. - and not in direct manufacturing. The study estimated that employment associated with total automotive industry activity in the United States was about 3.5 million jobs, and 6.6 million when all related activities are included. Annual compensation that was directly attributable to the industry was estimated to be about $152 billion.[54] The study estimates that about four in ten indirect jobs generated by the auto industry are in manufacturing, and most of them are in durable goods.[55]

The overall direction of motor industry employment was also affected by the 2003 industry collective bargaining agreement reached between the Big Three and the United Auto Workers union (UAW). Acknowledging that U.S. automakers were facing difficulties in increasing competition from foreign manufacturers, the UAW made a number of concessions to the automakers in the new contracts. Unlike the

[54] Compensation as used here is defined as the total contribution of the automotive industry, including wages and benefits, to U.S. private sector income.

[55] CAR study, p. 17.

1999 contracts, the 2003 contracts did not ban plant closings.[56] They were designed to help the Big Three respond to increasing competition:

- GM sought to save retiree costs, especially in rapidly rising healthcare outlays, because it has a higher ratio of retirees to current employees. Any increase in retiree pension and healthcare costs thus affects GM more than the other two major U.S. automakers. The UAW and GM reached an agreement in which GM would shut down three plants employing 1,500 workers, in exchange for assurances that it would continue to choose its unionized former affiliate Delphi for parts, as opposed to nonunion suppliers.[57]

- Ford sought to reduce excess capacity by shutting down five vehicle production plants protected by the previous contract. The UAW agreement with Ford let it close or sell four plants, to eliminate 4,600 manufacturing jobs through plant closures in the United States. There was to be a further reduction of 3,000 salaried positions in North America, and cuts of more than 4,000 jobs in Europe. With the plant closings, Ford could meet its goal of trimming North American production capacity by nearly one million units.[58]

- Chrysler wanted concessions from the union to help in vehicle assembly labor productivity so that it would become more competitive. In exchange, the company sought to enhance wages or post-retirement benefits for UAW members. The UAW said Chrysler identified nine plants that it wanted to close or sell, but that four would remain covered by the new agreement. Chrysler confirmed that it would close two parts plants, eliminating 1,580 jobs, and sell three others under the ratified contract.[59]

The effort between auto producers and the UAW in negotiating the new contracts was designed to help U.S. manufacturers address problems facing the industry. One of the issues is that the U.S. market may be facing overcapacity as foreign competitors continue to build plants in North America. The UAW agreed to certain plant closures in exchange for a preservation of wages and benefits. Some analysts have stated that while the new contracts offered hope for the Big Three, the union's concessions on plant closings may not have been enough and that the

[56] *Chicago Tribune*, "UAW Oks Pact with DaimlerChrysler," September 27, 2003, p. 2.

[57] *St. Louis Post-Dispatch*, "GM Contract Would OK Closings," Sept. 22, 2003, p. A5.

[58] *Automotive News*, "Ford Trims Capacity, Still Has Problems," October 6, 2003, p. 8.

[59] *Automotive News*, "More Cuts for a Bloody Chrysler," October 6, 2003, p. 6.

industry may need to close additional plants.[60] Most transplants are not unionized. Toyota, Nissan, Honda, BMW, and Mercedes employed about 48,000 non-union workers, with considerably lower total benefit costs.[61]

Textiles and Apparel[62]

Steeply rising imports and steeply declining employment in U.S. textile and apparel manufacturing[63] have brought considerable attention to and concern about these industries. Because of their importance to the U.S. economy, to certain U.S. geographic regions, and to many U.S. trade partners, textiles and apparel have been major issues in U.S. trade relations with a number of countries, leading to the signing of bilateral and multilateral agreements generally restricting the quantities of textiles and apparel traded, including the establishment of quotas.

The Economics of Textile and Apparel Production. Textile and apparel manufacture, and international trade in those products, have been important elements of economic activity and growth since the Industrial Revolution. Major reasons for this are (1) textiles and apparel are basic items of consumption in all countries, and (2) textile manufacture to some extent, and apparel manufacture in particular, are labor-intensive, requiring relatively little fixed capital for entrepreneurs to establish production facilities. Thus, these industries are major generators of employment. Modest capital requirements contributed to textiles and apparel becoming major industries at the start of the Industrial Revolution and remaining important to developing countries now. The percentage of total manufacturing value added accounted for by textile and apparel production among developing countries, for example, was triple the percentage among industrialized countries in 2000.[64]

Lower wage rates in developing countries together with the labor-intensiveness of apparel manufacture tend to give these countries a comparative advantage in apparel manufacture and a locational advantage for textile manufacture. Thus, textile and apparel manufacture is tending to shift to developing countries, with textiles and apparel constituting large portions of their exports. Textile and apparel manufacture (measured by constant-dollar value added) in industrialized countries declined between 1980 and 2000, whereas textile and apparel manufacture in developing

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[60] *International Herald Tribune,* "Big 3's Labor Deals Offer Hope But Union's Concessions on Plant Closings May Not Be Enough," September 25, 2003, p. 25.

[61] *USA Today*, "Foreign Companies Cast Long Shadow on UAW Negotiations," August 6, 2003, p. 1B.

[62] This subsection was written by Bernard A. Gelb.

[63] Common usage often includes apparel and other fabricated textile products under the general term "textiles." For greater precision, this report uses the more specific terms, with "textiles" generally meaning fibers and fabrics, and "apparel" meaning items of clothing other than footwear. Exceptions are where industry production and trade data are reported.

[64] United Nations, Industrial Development Organization. *International Yearbook of Industrial Statistics 2002*. Vienna: 2002. p. 55.

countries increased.[65] Between 1980 and 1999, textile and apparel exports of developing economies (in nominal dollars) rose 500% while developed economies' textile and apparel exports rose 125%. Textiles and apparel comprised 13% of developing economies' exports in 1999, versus 4% for developed economies.[66]

U.S. Textile and Apparel Production, Trade, and Employment. Textile and apparel manufacturing were two very large industries when the 1960s began; and U.S. textile and apparel manufacturing output rose respectably between 1960 and the early 1990s. Textile manufacturing production tripled between 1960 and 1994; apparel manufacturing production doubled. Since 1994, however, output by both industries has fallen (Table 4). In contrast, total U.S. manufacturing output nearly tripled between 1960 and 1994, and rose 20% more between 1994 and 2002, despite the recent recession.[67]

Table 4. Output, Productivity, and Employment in U.S. Textile and Apparel Manufacturing Industries

Years	Textile Mill Products			Apparel and Other Fabricated Textile Products		
	Output (1996 = 100)	Productivity (1996 = 100)	Employment (thousands)	Output (1996 = 100)	Productivity (1996 = 100)	Employment (thousands)
1960	33.6	23.1	924	50.4	37.1	1,233
1973	65.7	40.6	1,010	75.5	48.5	1,438
1987	86.6	72.7	725	93.5	76.0	1,097
1994	101.5	91.2	676	100.8	90.0	974
2000	95.4	112.0	531	102.4	142.1	634
2002	85E	n.a.	432	98E	n.a.	521

E - CRS estimate based upon Federal Reserve indexes of industrial production.
n.a. - Not available.

Source: Data in this table were obtained from the following BLS sets of data — "Major Sector Multifactor Productivity Index" series, and "National Employment, Hours, and Earnings" series.

More significant to many in the U.S. textile and apparel industries, employment in those industries has decreased markedly in the last three decades — by 57% and 64%, respectively, between 1973 and 2002. The two industries together employed about 950,000 in 2002, or 6% of total manufacturing employment, compared with

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[65] United Nations. *op. cit.* p. 58-59.

[66] United Nations. *1994 International Trade Statistics Yearbook, Vol. II*. New York: 1995. p. S-20, 76, 92; *1999 International Trade Statistics Yearbook, Vol. II*. New York: 2000. p. S-42, 98, 114.

[67] Production change data for U.S. industries used hereafter in this report are based upon indexes of real gross output derived by BLS — designed to reflect changes in the constant-dollar value of production — rather than in constant-dollar value added (used by the U.N.).

2.4 million, or 16% of total manufacturing employment in 1973. And the 700,000-decline in the two industries' employment between 1994 and 2002 equaled about 40% of the drop in total manufacturing employment.

Some of the decline in U.S. textile and apparel employment is linked to gains in productivity, and some to increases in importation of textiles and apparel. Output per hour in textile manufacturing more than tripled between 1960 and 1987, then rose more than 50% between 1987 and 2000. Apparel manufacturing output per hour doubled in the earlier period, and nearly doubled again in the shorter later period. Thus, gains in textile manufacturing productivity were more rapid between 1960 and 1987; and those in apparel manufacturing the most rapid more recently (Table 4).

U.S. imports of textiles in 2002 (in current dollars) ran more than three times their 1980 level; and 2002 apparel imports were more than ten times their 1980 level. Imports of all textiles and apparel exceeded exports by an estimated $62 billion in 2002. To a great extent, the increase in imports of apparel over the years reflects a number of sharp increases in imports. For example, there were two such increases in the 1960s, one in the 1970s, one in the 1980s, and one in the 1990s.

As can be seen from the import data above, U.S.-made textiles have fared less badly with respect to trade than U.S.-made apparel. Textile production is less labor-intensive, more easily automated, and, as a major input to apparel, can be exported to serve as inputs to foreign-made apparel that then is exported to the United States. The U.S. textile manufacturing industry also has been helped by requirements in many trade agreements and trade preference programs that U.S.-made fibers and fabrics be used to produce the apparel made abroad.

The considerable extent of U.S. textile and apparel trade with developing countries is indicated by the following 2002 data. For imports, 4 of the top 10 fiber and fabric import sources, 4 of the top 10 non-apparel textile product sources, and 8 of the top 10 apparel sources were developing countries. For U.S. exports, 7 of the top 10 fiber and fabric destinations, 4 of the top 10 non-apparel product destinations, and 7 of the top 10 apparel destinations were developing countries. Mexico was among the top five in all the above import and export product groups; and China was first as a textile product exporter and first as an apparel exporter to the United States.[68]

Textile Trade Policy and Agreements. In attempts to resolve conflicts between the interests of exporters and importers, the United States has signed a number of agreements (multilateral and bilateral) over the years generally restricting the quantities of textiles and apparel imported, including the establishment of quotas. The international Agreement on Textiles and Clothing (ATC) provided for the phasing out of those quotas by January 1, 2005. It placed trade in textiles and apparel under the rules governing other products, but with a provision allowing importing countries to impose transitional safeguard mechanisms to protect against damaging surges of imports of products not under quota and not yet integrated under World

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[68] The trade data used in this section are from the Dataweb database compiled by the U.S. International Trade Commission from U.S. Departments of Commerce and Treasury data, obtained stepwise October 2, 2003 from [http://dataweb.usitc.gov/scripts/INTRO.asp].

Trade Organization (WTO) rules. Developing countries, whose exports have been limited, considered the phase-out procedure as unfair, and pressed for accelerated implementation of the phase-out. They contended that the United States and other developed countries delayed import liberalization.

The United States has entered into several bilateral trade agreements in recent years. Because apparel and textile mill products account for 9% of exports by China to the United States, the agreement with China, reached November 15, 1999, probably is most important with respect to textiles and apparel. Among the wide range of issues covered, it incorporated the 1997 textile and apparel agreement between the two countries. Major elements of the 1999 agreement were (a) China, upon accession to the WTO, would "catch up" to the ATC schedule of quota phase-outs by 2005 for other WTO members, but the United States retained the right to impose safeguard measures through the end of 2008, allowing continuation of some quotas under some conditions, and (b) China would significantly lower its tariffs on a wide range of textile and apparel products, and not impose new nontariff barriers.

U.S. textile and apparel importers praised the agreement, especially regarding the quick ending of quotas. U.S. textile manufacturers were disappointed that the agreement did not continue the quotas on Chinese textiles and apparel for 10 years, a phase-out duration faced by other WTO members; and the industry trade group expressed concern over projected U.S. job and production losses.[69] U.S. labor, as represented by the AFL-CIO, criticized the agreement as failing to protect workers' and human rights. P.L. 106-286 created mechanisms to monitor China's compliance, and authorized the President to grant China permanent normal trade relations (PNTR) status after it joined the WTO. The President granted PNTR status to China on December 27, 2001, after it officially joined the WTO on December 11, 2001.

Imports of textiles and apparel from China subsequently rose 13% between 2001 and 2002, and increased 29% in the first seven months of 2003 over the same period in 2002. Increases in imports of three groups of textile and apparel products from China since the full phase-out of import quotas in January 2005 have been so rapid that the United States has put caps on imports from China of some of these items, as permitted under the China WTO accession agreement.[70] Analysis of the possible effects of China's accession to the WTO can be found in the section on trade agreement impacts later in this report.[71]

Recent bilateral trade agreements with Vietnam and Singapore also have negative significance for U.S. textile and apparel manufacturing. The July 2000 agreement with Vietnam was followed up in December 2001 with the U.S. granting

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[69] American Textile Manufacturers Institute, "Statement by Doug Allen, President, Regarding the U.S.-China WTO Agreement," Nov. 15, 1999. U.S. Association of Importers of Textiles and Apparel, "Importer Association Hails U.S.-China Agreement on WTO Accession," Nov. 15, 1999.

[70] *Inside US Trade*, "Commerce's CITA Approves Three China Safeguard Provisions," November 18, 2003.

[71] For more on U.S.-China trade relations in general and textile and apparel trade in particular, see CRS Issue Brief IB91121, *China-U.S. Trade Issues*.

normalized trade status to Vietnam, conditional on annual review under terms of the Jackson-Vanik amendment.[72] Such status significantly cut U.S. tariffs on most imports from Vietnam, leading to a very large increase in Vietnamese exports of textiles and apparel to the United States. An April 2003 agreement put quotas on 38 categories of Vietnam's clothing exports. The December 2002 trade agreement with Singapore makes Singaporean exports of textiles and apparel to the United States duty free if made from U.S. yarn or from materials further along the production chain that originate in the United States or Singapore. A limited amount of apparel exports from Singapore will be exempt for eight years, and tariffs on those exports will be phased out over five years. The United States commits to more liberal rules of origin once further liberalization of such rules is achieved in the WTO.

The U.S. Congress has made efforts to spur economic growth in poorer regions of the world, to some extent by providing textile and apparel trade benefits. Among the provisions of those measures, Congress has eased trade terms in stages on such goods from Andean, Caribbean, and sub-Saharan region countries.[73] The extent of these trade benefits is constrained by concerns that growth of textile and apparel production in the above regions has caused and could cause further difficulty for segments of the U.S. textile and apparel industries. Thus, as noted above, many of the trade preferences for textiles and apparel tend to require that U.S.-made fibers and fabrics be used to produce the apparel that is made in the beneficiary countries.[74]

Globalization: Impact on U.S. Manufacturing

The Manufactures Trade Balance[75]

Today "globalization" is a well-known phenomenon, and has been for nearly a generation. In the strictly economic sense, it means a focus on world markets as a source of inputs and as a place to sell goods and services, and as a destination for investment capital. In terms of direct impact on everyday lives, the world today is more globalized, both in a broader and a deeper sense, than ever before. This can be seen in terms of the amount of U.S. exports and imports expressed as a percent of GDP. After two generations of protectionist policies worldwide, an international economic depression and two world wars, U.S. imports and exports together equaled less than 10% of U.S. GDP in 1960, and just a little more than that 10 years later.

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[72] The Jackson-Vanik provision of the Trade Act of 1974 is found at 19 USC 2432. For details on U.S.-Vietnam trade relations, see CRS Issue Brief IB98033, *The Vietnam-U.S. Normalization Process*, by Mark E. Manyin, esp. p. 5.

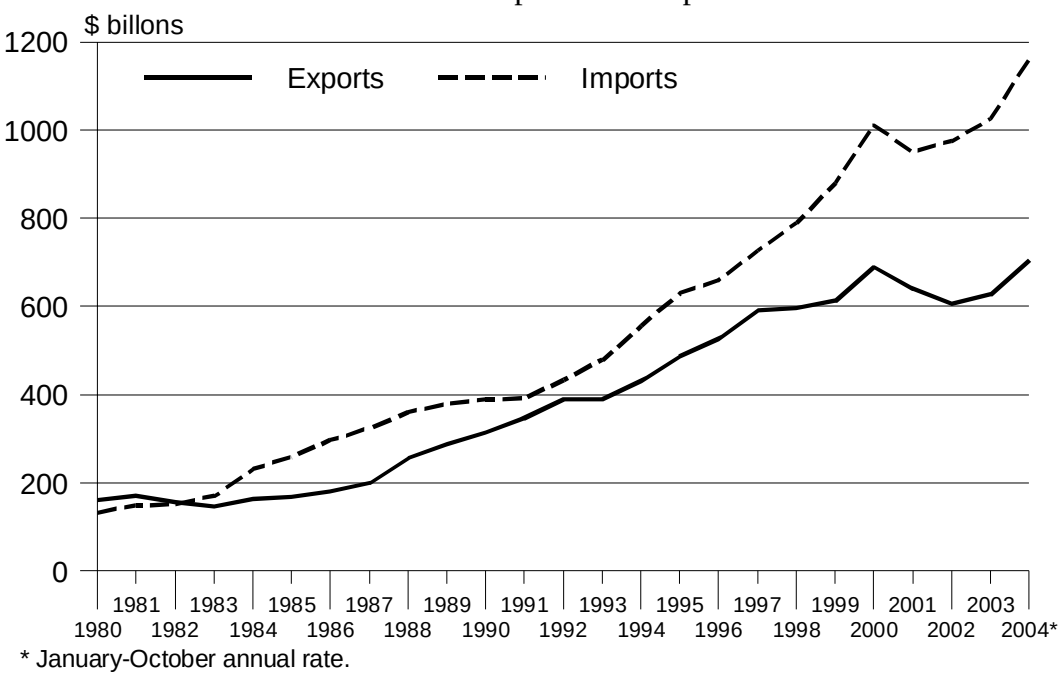
[73] See also CRS Issue Brief IIB95050, *Caribbean Basin Interim Trade Program: CBI/NAFTA Parity*; CRS Report RL30790, *The Andean Trade Preference Act: Background and Issues for Reauthorization*; and CRS Report RS21772, *AGOA III: Amendment to the African Growth and Opportunity Act*.

[74] For discussion and description of rules of origin in U.S. trade preference programs and free trade agreements, see CRS Report RL31934, *Textile and Apparel Rules of Origin in International Trade.*

[75] This subsection was written by Stephen Cooney.

Then the value of total trade compared to GDP doubled to more than 20% by 1980. In 1990 it was still at the same ratio, but by 2000 it increased to 26%.[76]

Figure 8. U.S. Manufactured Exports and Imports



Manufactures trade from Standard Industrial Trade Classification 5-9, including manufactured re-exports. Imports at customs value.
Sources: U.S. Dept. of Commerce. Bureau of the Census. Foreign Trade Division. 1989-2003data based on *FT900*: *U.S. International Trade in Goods and Services*, annual reports; 2004 data, *FT900*, October 2004;1980-88 data from National Association of Manufacturers, based on Census Bureau sources.

Manufactured Imports and Exports. **Figure 8** illustrates the relative growth of manufactured exports and imports since 1980. The overwhelming majority of U.S. trade in physical goods is in manufactured goods, which therefore account for most of the changes in the overall U.S. trade balance in physical goods. In 2003, for example, manufactures accounted for 77% of all U.S. goods exports (by comparison, agricultural commodities accounted for 8.5%); manufactures also accounted for nearly 82% of all U.S. goods imports (by comparison, mineral fuels accounted for 12%).[77]

In the early 1980s, as the figure shows, the United States still had a trade surplus in manufactured goods, but that surplus was declining. The U.S. economy grew

[76] Calculated from *Economic Report of the President, 2003*. Table B1. Addition of imports and exports is used only to illustrate the relative importance of trade in the total economy. In arriving at the calculation of total GDP, imports, that component of national consumption sourced abroad, are subtracted. For a detailed analysis of the macroeconomic aspects of the overall U.S. trade deficit and the deficit on the balance of payments on current account, see CRS Report RL31032, *The U.S. Trade Deficit: Causes, Consequences and Cures*, by Craig Elwell; and, CRS Report RL30534, *America's Growing Current Account Deficit: Its Cause and What It Means for the Economy*, by Marc Labonte and Gail E. Makinen.

[77] U.S. Dept. of Commerce. Bureau of the Census. Foreign Trade Division. *FT900: U.S. International Trade in Goods and Services*, 2002 Annual Report, Exhibit 14.

strongly after a recessionary period in 1980-82, the value of the dollar was rising, discouraging U.S. exports, and foreign markets, notably in Europe, were struggling with the effects of "stagflation." By 1983, the surplus turned into a $24 billion deficit. The deficit rose to more than $100 billion in 1986-88. It then declined to less than $100 billion for five years from 1989 through 1993, probably due to a reversal of exchange rate and growth trends, as well as the effect of a recession and a slow recovery in the early 1990s on U.S. domestic demand. Exports grew 8.8% per year during this period, and increased by $133 billion; imports of manufactures grew by $119 billion, or only 5.8% annually. Both export and import growth accelerated in 1993-7: manufactured exports grew by more than $200 billion, or more than 11% per year; but imports grew by $250 billion, or more than 13% annually.

Manufactured exports stopped growing after 1997. In 2002 and 2003 data, exports (including re-exports) were a little more than $600 billion, not substantially higher than the 1997 level of $593 billion. During the intervening years, there was only one strong export growth year: 2000 with a 12.5% rise to nearly $700 billion, but then exports fell by more than $50 billion the next year.[78] By contrast, manufactured imports continued to increase strongly, by nearly $300 billion, to more than $1 trillion in 2000. Manufactured imports then fell because of slower U.S. growth, but not as fast as exports. The manufactures trade deficit was more than $300 billion in each year after 1999, and reached $400 billion in 2003, an amount greater than one-quarter of estimated U.S. manufacturing output of $1.4 trillion.

Figure 9 illustrates the U.S. industrial goods trade balances according to "end-use" sectors. This is a different data set, so the data include some non-manufactured products, especially in industrial supplies and materials (though petroleum products have been subtracted in this calculation). This figure is not meant to imply that U.S. trade should be balanced in all sectors, but rather to indicate relative U.S. comparative advantage, and where the deficit has increased most sharply.

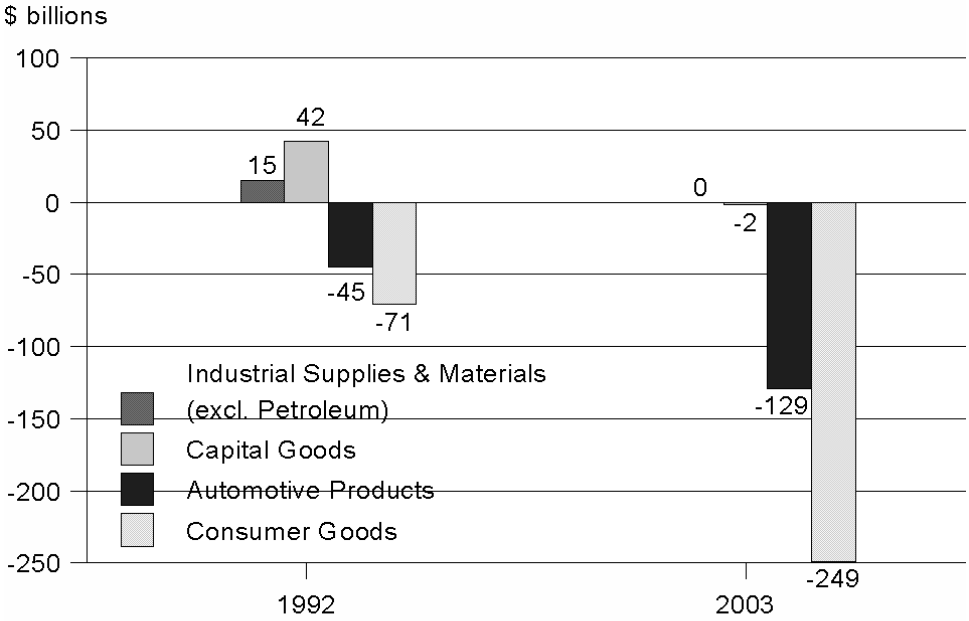
The figure shows that out of a total U.S. trade deficit of $548 billion in 2003, almost $380 billion was due to the deficits in consumer goods and automotive vehicles — and these deficits showed the strongest increases during the high-growth 1990s (a $270 billion combined negative change since 1992). While many complain about the large quantities of imported consumer goods in U.S. retail stores, the fact is that the United States has long had a deficit in manufactured consumer goods. Similarly, despite the rapid growth in transplant automotive manufacturing establishments discussed earlier, the automotive trade deficit increased by $84 billion between 1992 and 2003.

Capital goods — products used for the production of other goods and services — long the sector where the U.S. has had its greatest comparative advantage — turned negative by $2 billion in 2003, falling from a $41 billion surplus earlier. Non-

[78] Michael Mandel calculates that if total U.S. exports had grown by 18%after the 2001 recession, as they did in the equivalent time period after the recession in 1990-91, instead of the actual levels, total U.S. exports today would be $170 billion higher than they are and would have created a conservatively estimated 850,000 additional U.S. jobs; in "So Where Are the Jobs?: They're on the Way ... Or Maybe Not," *Business Week* (January 26, 2004), pp. 39-40.

oil industrial supplies and materials, used as inputs by U.S. manufacturers, showed a relatively smaller change in the 1990s, from a 1992 surplus of $15 billion to a slight deficit in 2003.

Figure 9. U.S. Trade Balances by "End-Use" Sectors



Source: U.S. Department of Commerce. Bureau of the Census. Foreign Trade Division. *FT900: Highlights of U.S. International Trade.* Annual Reports, 1992 and 2003.

Foreign Outsourcing. In view of the negative movement in the U.S. trade balance and the loss of domestic manufacturing jobs, foreign outsourcing of jobs has become a major issue. The loss of jobs in product groups where the United States may have lost much of its comparative advantage has long been understood, though not happily accepted (see the textiles and apparel discussion earlier, for example). But alarm has increased over apparent losses of jobs related to high-technology industries and services, for example, software programming and call centers. Two private research firms have reportedly estimated that large numbers of such service-sector jobs will move overseas: Forrester Research reportedly estimated that 400,000 such job displacements would occur in 2003, and Gartner Dataquest estimated that 500,000 IT vendor and services jobs would go by the end of 2004.[79] According to a report in the *Toronto Globe and Mail* on a McKinsey Global Institute report, Ireland was the largest country for U.S. IT and business-process outsourcing in 2002

[79] Steven Greenhouse, "IBM Explores Shift of Some Jobs Overseas,"*New York Times*, July 22, 2003, p. C1; Eric Auchard, "One in Ten Technology Jobs May Move Overseas,"*Chicago Tribune*, August 3, 2003, p. 5.

($8.3 billion), followed closely by India at $7.7 billion. Canada ranked a distant third with $3.7 billion.[80]

Official estimates of overseas investment by U.S. multinational companies show some increase in overseas commitments, but do not support contentions of large-scale or rapid growth in overseas outsourcing in recent years. For example, the number of persons directly employed at all foreign affiliates in which U.S. parents have a direct investment interest (greater than 10%) was stable at around 6.6 million persons between 1982 and 1993, according to Commerce Department data. That number had increased more than 40%, or almost 3 million employees, by 2000, the latest date for which such data are available. But the total employment reported by U.S. multinational parent firms remained concentrated in the United States. Employment at foreign affiliates of such firms rose only from 26% of their total employment in 1982, to 27.5% in 1993, to 29.3% by 2000. However, this number does not include overseas outsourcing by "contract manufacturers." Such firms as Solectron and Flextronics have become important manufacturers in the electronic businesses, while the 1990s also saw the rise of semiconductor manufacturing "foundries," such as Taiwan Semiconductor Manufacturing Company and United Microelectronics Corporation, and Singapore-based Chartered Semiconductor. These are all now multibillion-dollar enterprises.[81]

Nor does an examination of capital outflow numbers (equity increases and reinvested earnings) appear to indicate any recent surge of direct investment by U.S. manufacturers in Asia, in comparison with other regions. Total U.S. direct investment capital outflow in 2002 was $120 billion, little more than half the level of $209 billion in 1999. Investment in manufacturing affiliates was also down, from $40 billion to $30 billion. This was especially true in computers, electronics and components, where overseas investment by U.S. parents declined from $11 billion in 1999 and $17 billion in 2000, to about $1 billion in 2002, although this may well reflect that domestic IT manufacturers had a low level of earnings to invest anywhere. Overall, between 1999 and 2002, U.S. companies' cumulative direct investment in manufacturing affiliates increased $37 billion in Europe (22%), $20 billion in Canada (40%), and $15 billion in Asia and the Pacific (36%), while falling $5.5 billion (11%) in Latin America.[82]

Nevertheless, U.S. executives have stressed the attractiveness of Asian business locations for future investment and growth. Intel CEO Craig Barrett, recently opening a new semiconductor test facility in Sichuan, China, said:

> Most countries other than the [United States] provide incentives for the future ... People in these countries are fully capable of doing any engineering job a U.S. employee can do. New talent in these workforces is going to have a massive

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[80] David Ticoll, "Wise Up about Offshore Outsourcing," *Toronto Globe and Mail*, October 16, 2003.

[81] On the reviving boom in chip foundries, see *Business Week*, "A Chip Boom? In Asia, at Least," (Nov. 3, 2003).

[82] BEA "U.S. Direct Investment Abroad," *Survey of Current Business* (Sept. 2003), by Jeffrey H. Lowe, Tables 5 and 11.

> effect on where jobs are created ... Look at how Taiwan affected the global electronics industry, and then imagine that on ten times the scale.[83]

In a later interview, when he indicated that Intel is unlikely to increase hiring or to expand plant capacity in California, Barrett said that global competition and the maturing U.S. electronics market now mean that 70% of Intel's markets lie outside the United States; "Our investments are really following our customers," he concluded.[84]

But whether the location of new manufacturing jobs is driven by lower production costs or the need to be close to the customer base, it is clear that the recent U.S. experience is not unique: manufacturing employment is declining almost everywhere as productivity improves. Moreover, it is especially occurring in China, where the inefficient state-owned economic sector is being opened to domestic and international competition, resulting in large-scale job losses. According to a report by Alliance Capital economist Joseph G. Carson, manufacturing employment in China between 1995 and 2002 fell from 98 million to 83 million, a loss of 15 million jobs. Thus, China lost more manufacturing jobs during the past seven years than the total number of manufacturing jobs left in the United States.[85] Over the same period, the other largest manufacturing nations lost a total of 7 million manufacturing jobs. Of the 20 largest economies reported in Carson's analysis, only five showed any gains in manufacturing employment (Canada, Mexico, Spain, Taiwan and the Philippines). But their gains were only marginal and hardly offset the net total loss of 22 million manufacturing jobs among all major industrial countries, including China, during the period — a decline of 11% in employment, while output increased 30%.[86]

The Commerce Department's 2004 report, *Manufacturing in America*, indicated that the trend in foreign outsourcing, such as it is, may be one aspect of "structural changes shaping the competitive environment" of U.S. manufacturing companies. It ascribes these changes to three fundamental trends. First, there has been a technological revolution in manufacturing resulting from improvements in computing, communications and distribution. Moreover, this revolution has been global, and not just restricted to U.S.-based companies. The Commerce report notes, for example, that in the 1960s, 60-70% of global research and development activities occurred in the United States and were largely funded by the federal government. Now the U.S. private sector finances twice the level of R&D of that financed by the government, and the U.S. share of the global total is only 30%.

Second, as mentioned earlier in the present report, successive reductions of tariff and non-tariff barriers through international trade negotiations have substantially

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[83] Quoted from Xinhua Financial Network. "Global Job Shifts Toward Asia Threaten Future US Employment — Intel CEO" (Aug. 28, 2003).

[84] Reuters. "Intel CEO Says California Has Lost Its Luster," (October 21, 2003).

[85] Some would observe that comparing the situation of state-owned enterprises in China, many of which were never viable on a market basis, to the situation of American manufacturers is a major simplification.

[86] Joseph G. Carson. "AllianceBernstein US Weekly Economic Update," October 10, 2003.

increased the role and impact of international trade in the U.S. economy. And, third, the end of the Cold War and important policy changes in many major countries have led to an emergence of new participants in the international economy, notably China, as indicated just above, and countries formerly comprising the Soviet Union and its bloc in eastern Europe — participants which are also international competitors. In such an environment, the Commerce Department argues, competition is increasingly not horizontal competition between individual companies, but rather competition between different vertically integrated supply chains.[87]

The Dollar Exchange Rate and U.S. Manufacturing[88]

With the slowdown in U.S. manufacturing growth at the end of the 1990s, the impact of a relatively high value of the dollar in foreign exchange again became a major concern for many. This section of the paper examines the case for a causal linkage between exchange rates and manufacturing employment. While, in principle, exchange rate variations could affect both a nation's imports and exports, and hence, employment, the empirical case is mixed. First, neither in the short or the long term are exchange rates the singular influence on manufacturing employment. Swings in the business cycle account for significant short term employment variation, while in the long term the effects of productivity growth exert an important influence. Second, data from 1980 to 2005 show periods where the variation manufacturing employment is consistently predicted by changes in the exchange rate, but also periods where the two move in an inconsistent manner. Finally, expert opinion reflects the mixed state of empirical evidence. For example, while some observers believe an upward revaluation of the Chinese yuan would provide a significant boost to manufacturing employment in the U.S. by increasing the competitiveness of our exports and reducing our imports, others believe the effect would be minimal, merely increasing our imports from countries other than China, with little effect on employment or our aggregate trade balance.

Market-Based Exchange Rate Systems. Since the early 1970s, the value of the U.S. dollar in terms of other currencies has been determined through a system of flexible exchange rates. In this system, governments typically do not control the value of their currencies as a matter of policy, but let the market forces of supply and demand determine the value. In principle, the value of a nation's currency is directly related to the balance of trade, as well as flows of international capital into and out of the country. By affecting relative costs, and hence sales, of both imported and exported goods, the exchange rate may also affect both sectoral and general macroeconomic activity. As a result, macroeconomic variables such as employment, inflation, and the rate of economic growth may all be influenced by the exchange rate.[89]

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[87] *Manufacturing in America*, pp. 22-30.

[88] This subsection was written by Robert Pirog.

[89] The U.S. dollar plays a key role in the world monetary system, because it serves as an international means of payment, as well as being the standard to which some nations peg their exchange rate, if they are not market-determined. Since the dollar serves these functions, a variety of benefits, costs and uncertainties are created.

The degree to which exchange rate variations affect sectors of the economy, like manufacturing, or even the overall economy, depends on how open that sector, or economy, is to world markets. The openness of an economy depends on the level of tariffs, capital controls, and the degree to which competitive products are produced in other nations.

Researchers measure the degree of openness by adding an industry's exports and imports, and expressing the sum as a proportion of the industry's domestic sales, exports and imports. By this measure, the openness of the U.S. manufacturing sector has grown sharply since the early 1970s. The growth rate of openness in U.S. manufacturing has averaged over 5% per year from 1972 to 2003. The growth has not been uniform, however. Industries that were the most open to the world economy in 1972 have shown the highest growth of openness. This heterogeneous pattern implies that some sectors of the manufacturing industry are experiencing substantial international competition, while other sectors might remain relatively isolated.[90]

On a bilateral basis, internationally traded currencies bear a symmetrical relationship to one another. When one currency is appreciating, this is equivalent to saying the other currency is weakening, and vice versa. For example, if the dollar is being compared to the euro, a declining value of the dollar is equivalent to an increasing value of the euro. Exchange rates can only be expressed relative to another currency. However, for many purposes it is more useful to express the value of a currency relative to the value of a basket of currencies of the nation's important trading partners. In this case, the value of a particular currency rises or falls against the weighted average of the nation's trading partners, with the same symmetrical value relationship holding.

When the value of a currency is market determined, the event that initiates a change in the exchange rate is usually a change in the demand and/or supply of assets(the international capital market), or a change in the demand and/or supply of goods and services in international trade. As a nation's currency is rising in value, or appreciating, the nation will typically move toward a trade deficit, as imports become cheaper and exports more expensive, as well as experiencing a net inflow of foreign capital. When the nation's currency is falling in value, or depreciating, the nation will typically move toward a trade surplus and experience a net outflow of capital.

Is it then better for a nation to have a currency whose value is rising or falling, high or low? The answer depends on where you stand in the economic system. A high, or appreciating, dollar is good for U.S. buyers of imported goods, many of which seem cheap in comparison to domestic goods. The resulting inflow of lower price imported goods also keeps domestic inflation low. The same high, or appreciating, dollar is bad if you are the owner of, or a worker in, a firm that is in an import competing or export oriented industry that is losing sales, profits and jobs to foreign competition. A low, or depreciating, dollar should reverse the relative

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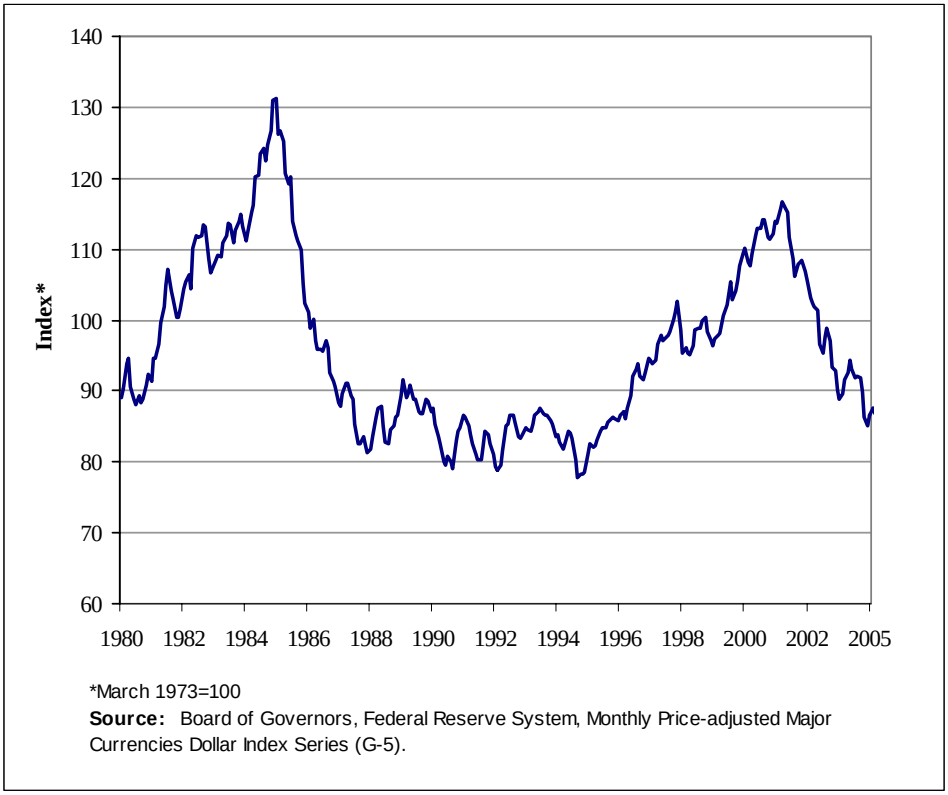
[90] Michael W. Klein, Scott Schuh, and Robert K. Triest, "Job Creation, Job Destruction, and the Real Exchange Rate," *Journal of International Economics* LIX:2 (March 2003), pp. 245-248.

positions of consumers and workers. In reality, these relationships are neither so clear, or simple. A manufacturer who competes in the export markets may rely on imported production inputs or components that rise in cost as the dollar falls.

The Dollar, the Trade Balance and Employment in Manufacturing. Because the dollar exchange rate is determined in an open currency exchange market, its value can be expected to change over time, reflecting, among other things, changing conditions of demand and supply. Changes in the value of the dollar are typically measured in terms of a trade-weighted index, generally including a set of nations that are important industrial trading partners whose currencies are widely traded on international markets.[91] **Figure 10** shows the movement of the nominal major currencies dollar index from 1980 to July 2005.

Figure 10. Dollar Index: Price-Adjusted Major Currencies



*March 1973=100

Source: Board of Governors, Federal Reserve System, Monthly Price-adjusted Major Currencies Dollar Index Series (G-5).

On the basis of this index, the dollar reached its highest level in the history of the data set in March 1985. The lowest level was attained ten years later in April

[91] Economists also use real exchange rate indexes that control for the relative differential inflation rates in trading nations. The Federal Reserve real index of the dollar exchange rate against major foreign currencies has generally paralleled the nominal index for the past 20 years, as most major trading nations have set a priority on bringing down rates of inflation. Over the period covered in this report, the nominal and real major currencies indexes convey a consistent picture of changes in the value of the dollar. The Federal Reserve reports the value of both indexes on a monthly basis. The data are available at [http://www.federalreserve.gov/releases/H10/Summary].

1995. From that low point, the dollar rose by approximately 50%, achieving a peak value in February of 2002. By the end of 2004, much of that appreciation had been reversed, leaving the dollar less than 10% higher than at the low point in 1995. During the first six months of 2005 the dollar appreciated by about 5% overall.

During the period January 1981 until the dollar peak of March 1985, the dollar appreciated by approximately 47%. Manufacturing employment declined by about 4%. During the same period, the goods balance of payments moved from a $28 billion deficit to a $120 billion deficit, over a fourfold increase. Goods exports fell by about 2%, goods imports rose by 32%.[92]

The ten year period of general decline of the dollar after the peak of March 1985 until the low point of April 1995 resulted in a dollar depreciation of about 45%. Manufacturing employment again declined by approximately 4%. The goods balance of payments varied over the period, deteriorating from 1985 to 1987 and then improving from 1987 to 1992. Large, increasing, deficits characterized 1993-95, reaching $174 billion in 1995. Goods exports increased by more than 160% over the period, but goods imports rose by 121%, from an initial base of imports which were more than 50% larger than exports in 1985.

Although the time-frames are different for the 1980-85 period of dollar appreciation and the 1985-95 dollar depreciation, the magnitudes of dollar variation are similar. Also similar is the fact that manufacturing employment declined in both circumstances, albeit more slowly in the period of the falling dollar. On the basis of this evidence, it would be hard to make the case that the exchange rate had the theoretically predicted effect on manufacturing exports, production and employment over these periods, although it is possible that a falling dollar exchange rate and higher exports contributed to the modest increase in manufacturing employment in the early 1990s. It is also possible that the effects of rising productivity, shifting demand patterns and international capital mobility more than cancelled the effects of exchange rate changes during the 1990s.

The dollar again appreciated from April 1995 until it peaked in February of 2002, increasing in value by about 40%. Manufacturing employment declined by approximately 10% over the period. The goods balance of payments deficit grew sharply over this period, increasing from $174 billion in 1995 to $482 billion in 2002. Goods exports increased from 1995 to 2000 by about 34%, but then declined in both 2001 and 2002, falling by about 12% in those two years. Goods imports increased by 55% over the period.

The period from January 2002 to November 2003 showed the overall value of the dollar depreciating by about 17%. Manufacturing employment declined by an additional 7% or 1.13 million jobs over the period. In at least one case, potential jobs were lost because the value of the dollar declined. As reported in the *New York Times*, Daimler-Chrysler announced the cancellation of a $750 million investment

[92] Import, export and trade balance data are from the U.S. Census Bureau, Foreign Trade Division website, [http://www.census.gov/foreign-trade]. Goods trade is dominated by manufactured goods which in 2002 represented 80% of U.S. goods exports and 84% of U.S. goods imports.

in Georgia which might have generated 3000 jobs, at least in part because of dollar depreciation which made the importation of components from Europe too expensive, reflecting the point made earlier about the effect of a depreciating dollar on imported production imports.[93]

While the exchange rate may be an important factor in determining the competitiveness of U.S. manufacturing, it is hardly the only factor. Economic recession, changes in productivity, changes in technology, as well as structural changes in domestic and international business all play a role. Comparing Figures 1 and 10 shows that there are periods when the linkage between exchange rates and employment appears consistent with exchange rate theory. For example, the decline of the dollar after the peak attained in March 1985 is followed by a period in which manufacturing employment stabilized and increased. However, the most recent data seem, at this point, inconsistent with the theory. The decline in the dollar since February 2002 has been accompanied by a sharp decline in manufacturing employment, consistent with the domestic economic slowdown. Moreover, the data on manufacturing employment as a share of total employment, shown in Figure 2, suggest that manufacturing's share of all employment has declined both in periods when the dollar was appreciating and when it was depreciating. Although the speed of the decline in employment might be affected by the exchange rate, its overall trend has been downward since the 1960s.

Several research efforts have examined the forces influencing manufacturing employment and have reached mixed conclusions. John A. Tatom, of the Federal Reserve Bank of St. Louis, found little relationship between the exchange rate and manufacturing employment. In fact, he found that in the 1980's manufacturing output expanded more during periods of a strengthening dollar than during periods when the dollar was weakening. For Tatom, the principal factors in the decline in manufacturing employment are productivity improvements and the sensitivity of demand for manufactured goods during declines in over-all economic activity. Productivity improvements tend to reduce the relative price of manufactured goods and require fewer workers for any given level of output. The enhanced productivity of workers suggests that firms should expand employment, while the decreasing relative price of manufactured goods suggests that firms should reduce employment. A fall in the relative price of manufactured goods raises the cost of manufacturing labor relative to its productivity — any given wage is set against lower revenue due to decreased price. In effect, a decline in the relative price of manufactured goods is equivalent to an increase in the manufacturing wage rate relative to non-manufacturing labor, which reduces the incentive to hire labor. As per the next paragraph, the falling price of manufactured goods relative to other goods and services stimulates demand for manufactured goods, but this increase must overcome the wage/productivity effect for more workers to be hired.

For the productivity effect to offset the price effect, the demand for manufactured goods should expand more than proportionately to a given fall in price.

[93] "DaimlerChrysler Drops Plan for Van Plant," *New York Times*, (Sept. 24, 2003), p. C16.

Tatom finds that this is not the case, and the price responsiveness (elasticity) of manufactured goods demand is low.[94]

Michael Klein, Scott Schuh and Robert Triest of the Federal Reserve Bank of Boston examined the relationship between job creation, job destruction and the real exchange rate in the manufacturing industries. They found, using econometric analysis applied to a data set from 1973-1993, a number of important relationships between the exchange rate and manufacturing employment. First, the authors found that the sensitivity of job destruction to the exchange rate depends on the openness of that particular industry to trade, either in exports or in import competition. This result is expected. Second, they found that while job destruction is related to the exchange rate, job creation is significantly less related. This asymmetric relationship implies that when the dollar appreciates the rate of job loss is accelerated, but when the dollar depreciates, jobs are not necessarily created. The rate of manufacturing job destruction merely returns to its historic trend. This relationship appears to be continuing in more recent data where it consistently appears that higher values of the dollar may contribute to job losses, but a decline in the dollar rarely reverses the situation.[95]

If the Klein, Schuh and Triest results are an accurate description of the forces facing the manufacturing industry, policy based on realigning exchange rates can be expected to have only limited effectiveness. From this perspective, an appreciation of the Chinese yuan, or the other Asian currencies against the dollar might slow the rate of job loss in American manufacturing, but would be unlikely to cause net job creation. A different perspective is provided by C. Fred Bergsten of the Institute for International Economics. He feels that an appreciation of the Chinese yuan on the order of 20-25% would also encourage a number of other East Asian countries to allow their currencies to appreciate. Such a regional currency appreciation could lead to the creation of as many as 500,000 U.S. manufacturing jobs, in Bergsten's view.[96]

Asian Economies and the Dollar. Considerable concern has been expressed that many Asian countries have been deliberately keeping their currencies undervalued against the U.S. dollar, in order to promote their exports. This view has been emphasized by the Coalition for a Sound Dollar, an advocacy group made up of more than 80 trade associations, who believe the strong dollar is still damaging American manufacturing.[97] They feel that the real problem lies mainly with four nations, China, Japan, Korea and Taiwan, who, the Coalition charges, have taken actions to keep the values of their currencies artificially low to gain an export advantage, or to impair or negate trade concessions. The Coalition asserts that such policies could be in violation of World Trade Organization and International Monetary Fund rules.

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[94] John A. Tatom, "Why Has Manufacturing Employment Decreased?" *Federal Reserve Bank of St. Louis Review*, December 1986, pp. 15-25.

[95] Klein, Schuh, and Triest, pp. 255-259.

[96] C. Fred Bergsten, comments on PBS *Newshour with Jim Lehrer* (Sept. 3, 2003).

[97] Coalition for a Sound Dollar, *The Overvalued Dollar — Six Years Later*, available at the website [http://www.ssci.org/images/mfg-report.pdf].

As evidence for their charges, the Coalition cited seven instances of currency intervention in 2002 by Japan, for a total of $33 billion in exchange markets, that were designed to keep the value of the dollar above ¥115. They cite similar interventions, designed to weaken the yen in 2001, totaling $28 billion. The Coalition also cites numerous threats of intervention by Japanese government officials lauding a weaker yen and threatening currency market intervention. In March 2004, it was reported, however, that Japan had ended its campaign to weaken the yen against the dollar. A recovering domestic economy and a strong outlook for exports were cited as reasons for the policy shift.[98]

For Taiwan and Korea similar interventions are described, with these nations buying $60 billion to weaken their currencies against the dollar. But other observers do not attribute such currency actions to a desire to manipulate exchange rates in order to increase exports. They have characterized the Japanese intervention and other measures merely as a means to manage the decline of the dollar to prevent it from falling too quickly, which could have damaging effects on the Japanese economy.[99]

Until very recently, and then only with respect to the Japanese yen, there has been very little movement of the dollar against the currencies of Japan, Taiwan, and South Korea. Over the period August 2002 to August 2003 the dollar declined by almost 9% as measured by the major currencies index. Over the same period, the yen itself changed little against the dollar. In August 2002, the yen traded at 118.99 to the dollar and in August 2003 it traded at 118.66 to the dollar, a variation of less than 0.3%. The dollar weakened by 1.5% against the Korean won and appreciated by 1% against the Taiwan dollar over the same period.

During the period August 2003 to November 2003 the dollar declined by 6% against the major currencies index. The dollar also declined, by 8%, against the yen. The dollar has stayed much steadier against the other two East Asian currencies: from August 2003 to November 2003 it appreciated by 0.6% against the won and depreciated by 1% against the Taiwan dollar.

Problems exist in establishing clear causality between these currency interventions and fluctuations in the exchange rate. In 2001, foreign exchange transactions were $1.4 trillion per day on world currency markets.[100] Total reserves held in central banks worldwide were $1.7 trillion. Over 90% of foreign exchange market transactions are carried out by foreign exchange dealers and financial institutions. Currency interventions on the scale of those cited by the Coalition for a Sound Dollar by Japan and other nations may not have been sufficient to stabilize the value of the yen and other currencies at a value that was far from a market

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[98] Leo Lewis, Richard L. Perry and Robert Thomson, "Japan Ends Its $150 Billion Currency Intervention as Economy Firms," *Times Online* (U.K.), Mar. 29, 2004.

[99] Christian E. Weller and Laura Singleton, *Reining in Exchange Rates: A Better Way to Stabilize the Global Economy*, Economic Policy Institute, Briefing Paper #131, Sept. 2002, p.5.

[100] The amount of currency that actually changes hand on a settlement basis is a fraction of this total.

equilibrium. An unmeasurable influence is the degree to which the Japanese actions signaled the market, altering the actual market outcome.

The case of China has been different from that of Japan and many other Asian exporters. China maintained a fixed exchange rate of 8.28 yuan per dollar from 1994 to July 2005. The value of the yuan did not float against the dollar and China maintained controls on capital. China has a surplus in its trade balance with the United States, the U.S. deficit totaling $72 billion in the first five months of 2005,[101] and holds foreign exchange reserves in excess of $300 billion. Many observers agree that the yuan has been undervalued, which has contributed to the trade imbalance and the resulting buildup of financial surpluses in China. The extent to which the yuan continues to be undervalued is open to question. The *Economist* magazine estimates the level at 56%, while an economist at the Manufacturers Alliance trade association estimates 40%, and other analysts suggest a level of 10-15%.[102] Secretary of the Treasury John Snow undertook a trip to China in September of 2003 to discuss the exchange rate imbalance with Chinese leadership. The Chinese offered to allow the yuan's value to float in the market at some time in the future, but made no definite commitment. In July 2005, the Chinese government announced that the yuan would no longer be linked to the dollar. Instead, it would be tied to a basket of currencies. At the same time, they allowed a 2% increase in the dollar value of the yuan.[103]

The Chinese may have good reasons not to be eager to jump into the world of market determined exchange rates. The fixed value of the yuan was looked at as an important pillar of stability during the Asian financial crisis of 1997-98. China's current account trade surplus is based largely on U.S. trade, and its surplus with the rest of the world has been declining. With capital constraints in place it is difficult to assess the true value of the yuan. If capital were allowed to flow freely, it is not inconceivable that capital might flow out of China on a net basis which would tend to push the value of the yuan lower. The fixed exchange rate policy of China reflects its desire for stability. Until the economic structure of China is judged to be capable of withstanding the volatility of world markets, the likelihood of a change in China's exchange rate policy may be low.[104]

On October 30, 2003 Treasury Secretary John Snow presented the Treasury Department view on this issue, when he discussed the semiannual report to Congress on exchange rates and international economic issues. The report's purpose is partly to evaluate the exchange rate policies of many trading nations. The report, which reviewed developments in the first half of 2003, concluded that no nations, including China and Japan, were manipulating the value of their currencies to obtain unfair trade advantage. Secretary Snow acknowledged that, while China continued to peg its currency to the dollar and Japan had been intervening in currency markets, those

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[101] *FT900* (July 2005), Exhibit 14.

[102] "Flying on One Engine: A Survey of the World Economy," *The Economist*, Sept. 20, 2003, p.25.

[103] James T. Areddy et al., "China Lets Yuan Rise vs. Dollar, Easing Trade Tensions Slightly," *Wall St. Journal* (Jul. 22, 2005), p. A1.

[104] For more detail, see CRS Report RS21625, *China's Currency Peg: Implications for the U.S. and Chinese Economies*, by Wayne M. Morrison and Marc Labonte.

actions in themselves did not meet the technical requirements under the Omnibus Trade and Competitiveness Act of 1988 to support a finding of unfair currency manipulation.[105]

Secretary Snow reiterated the Bush Administration's belief that currencies of major nations, especially China, should be market determined. He also pointed out that the Administration believes that bilateral financial diplomacy was the course of action most likely to result in movement toward the goal of market- determined currency values.[106] However, Secretary Snow observed in May 2005 that if China did not alter its policies, they would likely meet the statutory technical requirement for designation as manipulating their currency to gain a trade advantage. China's alteration of its exchange rate mechanism was likely influenced by pressure from both the Bush Administration and Congress.[107]

Federal Reserve Board Chairman Alan Greenspan pointed out in a 2003 speech that if, as most observers seem to agree, the value of the Chinese yuan is out of alignment with market valuation, this might very well have adverse effects on world capital markets and, at least indirectly, affect U.S. jobs and employment. He did not, however, see a revaluation of the yuan as having much effect on aggregate U.S. employment. He stated that if currency realignment reduced imports from China, they would tend to be replaced by imports from other nations that compete with China. He further noted that a rapid exposure of the yuan to market forces would have uncertain consequences for China's fragile banking system as well as providing no guarantee that the yuan would actually rise in value. He also stated that the potential long term benefits to the world trading system of a prosperous China are important enough that a careful approach to currency valuation and market determined capital flows should be followed.[108]

The Impact of U.S. Trade Agreements[109]

The United States has been actively pursuing trade agreements over the last two decades. It has had free trade agreements with Canada and Israel since the 1980s. In 1994, it implemented the North America Free Trade Agreement (NAFTA) with Mexico and Canada. Since then, it has concluded several agreements and is actively pursuing others. Free trade agreements (FTAs) raise some important policy issues for Congress as it considers the implementing legislation, including the impact on U.S. manufacturing.

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[105] U.S. Dept. of the Treasury. "Testimony of Treasury Secretary John Snow Before the Senate Committee on Banking, Housing and Urban Affairs" (Oct. 30, 2003), pp. 1, 3-4; and, *Report to Congress on International Economic and Exchange Rate Policies*, JS-954 (Oct. 30, 2003), pp. 1, 6-7.

[106] Snow, "Testimony," p. 4.

[107] U.S. Dept. of the Treasury. *Report to Congress on International Economic and Exchange Rate Policies*, JS-2448 (May 2005), p. 2.

[108] Federal Reserve Board of Governors. "Remarks by Chairman Alan Greenspan Before the World Affairs Council of Greater Dallas," (Dallas, TX, December 11, 2003).

[109] This section was written by M. Angeles Villarreal and Stephen Cooney.

In 2000, the United States completed negotiations with Jordan for a bilateral free trade agreement, which went into effect in September 2001. Subsequently, the United States completed free trade agreements with Chile, Singapore, Morocco and Australia, which were approved by Congress and signed into law.[110] The Bush Administration has also submitted to the 109th Congress an FTA that it has negotiated with five Central American nations and the Dominican Republic.[111] The broadest initiative has been the multilateral trade negotiations in the World Trade Organization (WTO), known as the Doha Round. Another major multilateral initiative is the Free Trade Area of the Americas (FTAA), in which the United States is continuing trade negotiations with 33 other Western Hemispheric countries. Other initiatives include FTAs with Thailand, South Korea, and the Southern Africa Customs Union.

Effects of NAFTA on US. Industry. In the early 1990s, the United States entered into trade negotiations with Mexico, which later included Canada, to form the North American Free Trade Agreement, effective in January 1994. NAFTA is the first major trade agreement the United States has had with a developing country where per capita income is much lower than in the United States. The difference in income levels raised concerns that Mexico's lower wages would lead to a large number of U.S. jobs being relocated to Mexico as industries adjusted to the changes in trade and investment regulations. While the integration of the U.S., Mexican, and Canadian economies was expected to make the U.S. economy more productive and globally competitive, the adjustment costs were expected to be more concentrated in communities with a large number of manufacturing jobs, such as the automotive, textile, and apparel industries.

The full effects of NAFTA on the U.S. economy are still unclear. Proponents of NAFTA claim that the agreement has increased U.S. trade with Mexico and Canada, and benefitted the U.S. economy. They believe that NAFTA has had a positive impact on U.S. trade and investment with Canada and Mexico, and that NAFTA has increased U.S. exports to Canada and Mexico.[112] Critics of NAFTA argue that hundreds of thousands of U.S. jobs have been lost because of the agreement. NAFTA critics generally base their arguments on the increasing trade deficit with Mexico, stating that increasing U.S. imports from Mexico have caused plant closures and job losses in the United States.

There are a number of reasons why the overall effects of NAFTA are not easily measured. First, it is difficult to isolate the effects of NAFTA because of other

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[110] For details on the agreements see CRS Report RL31789, *U.S. Singapore Free Trade Agreement*; CRS Report RL31144, *U.S.-Chile Free Trade Agreement: Economic and Trade Policy Issues*; CRS Report RS21464, *Morocco-U.S. Free Trade Agreement*; and CRS Report RL32375, *The U.S.-Australia Free Trade Agreement: Provisions and Implications*. For issues related to labor see CRS Report RS21560, *Free Trade Agreements with Singapore and Chile: Labor Issues*, by Mary Jane Bolle.

[111] See CRS Report RL31870, *The Dominican Republic-Central America-U.S. Free Trade Agreement*; and CRS Report RS22159, *DR-CAFTA Labor Rights Issues.*

[112] See Council of the Americas and the U.S. Council of the Mexico-U.S. Business Committee, *NAFTA at Five Years,* prepared by the Trade Partnership, Washington, D.C., January 1999.

variables affecting trade and investment such as economic growth and exchange rates, both of which affect consumer spending and the demand for imports, foreign investment, employment levels, and relative wages. Second, some of the market opening measures in Mexico that resulted from NAFTA were already taking place prior to the agreement and NAFTA may have only accelerated the process. While trade expansion arguably has benefitted the overall U.S. economy in terms of improved production processes, and the increased availability of goods and services for U.S. consumers at lower cost, there also have been job losses associated with NAFTA. Two of the U.S. workforce sectors that have been most affected are the textiles and apparel industry, and the automotive industry.

The overall effect of NAFTA on the U.S. economy has been relatively small, primarily because two-way trade with Mexico amounts to less than three percent of U.S. GDP. Therefore, any changes in trade patterns with Mexico would not be significant in relation to the overall U.S. economy. In some sectors, however, trade-related effects could be expected to be more significant, especially in those industries that were more exposed to the removal of tariff and non-tariff trade barriers, such as the textile, apparel and automotive industries. Most of the trade-related effects of NAFTA may be attributed to changes in U.S. trade and investment patterns with Mexico. At the time of NAFTA implementation, the U.S.-Canada Free Trade Agreement already had been in effect for five years and some industries in the United States and Canada were already highly integrated. Most tariffs on industrial products traded between the United States and Canada were zero at the time of NAFTA implementation. In contrast, Mexico had followed an aggressive import-substitution policy for many years prior to NAFTA in which it had sought to develop certain domestic industries through trade protection.

The Department of Labor NAFTA-Trade Adjustment Assistance[113] program provides some data on the number of workers covered by certification. The number of certified workers is not the same as the number of jobs lost due to NAFTA, but it provides some indication of the adjustment costs of NAFTA.[114] Between January 1994 and December 2001, 415,371 workers were covered by NAFTA-TAA certification. The industry with the highest number of NAFTA-TAA certified jobs was the combined textile and apparel industry, with 34% of total NAFTA-TAA certifications, followed by the automotive industry, with 6% of the total. NAFTA-TAA certification figures may have overestimated job losses among certified workers because not all certified workers may have actually lost their jobs. Data from the Department of Labor suggest that as few as 20-30% of certified workers collect NAFTA-TAA benefits. Certified workers may not have actually lost their jobs, may

[113] Congress included a NAFTA Transitional Adjustment Assistance (NAFTA-TAA) Program in the NAFTA implementing legislation to address concerns regarding worker dislocations. The NAFTA-TAA Program, which was later consolidated with the former Trade Adjustment Assistance (TAA) program and is now part of a new reformed TAA Program, provided assistance to workers who lost their jobs due directly to import competition or production shifts to Mexico or Canada.

[114] CRS Report RS20229, p. 6.

have found another job, or may not have collected benefits for other reasons.[115] On the other hand, the actual number of jobs lost may be higher than the number of those certified, because not all workers who have lost their jobs due to import competition or production shifts have necessarily applied for, or would qualify for, certification.

The main NAFTA provisions related to textiles and apparel were the elimination of U.S. tariffs and quotas for goods coming from Mexico, and elimination of Mexican tariffs on U.S. textile and apparel products. Goods are required to meet the rules of origin provision, assuring that apparel products traded among the three NAFTA partners are made of yarn and fabric made within the free trade area. Without a rules of origin provision, apparel companies would have been able to import fabrics from Asia at lower cost and export the final product to the United States under the free trade provisions. Textile and apparel quotas, as noted earlier in this report, were eliminated in January 2005, and all exporters of such products to the U.S. market, as well as domestic producers, are faced with intensified competition from China.[116]

Between 1993 and 2001, U.S. trade in textiles and apparel with Mexico increased more rapidly than U.S. trade with all countries, suggesting that Mexico may have begun supplying the U.S. market with goods that would have otherwise been supplied by Asian countries. The share of U.S. trade with Mexico in textiles and apparel increased from 8% of U.S. world trade in textiles and apparel in 1993 to 16% percent in 2001. In comparison, the share of U.S. trade with Asia in textiles and apparel decreased from 55% in 1993 to 45% in 2001. The trade deficit with Mexico in textiles and apparel also increased more rapidly than the total U.S. deficit in these products, from $760 million in 1993 to $4.2 billion in 2001. While the large increase in U.S. imports from Mexico may have displaced U.S. workers in the textiles and apparel industries, some studies have suggested that NAFTA may have helped the U.S. textile industry by shifting production from Asian countries to North America. For example, one study reported that U.S. imports from NAFTA countries tend to have a higher U.S. content than imports from outside the region, such as China, Hong Kong, and Taiwan.[117]

NAFTA automotive provisions include the phased elimination of tariffs, gradual removal of many non-tariff barriers to trade, rules of origin provisions, enhanced protection of intellectual property rights, less restrictive government procurement practices, and the elimination of performance requirements on investors from other NAFTA countries. Its significance is summarized in **Table 5**.[118] Because the U.S.

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[115] CRS Report 98-782 E, *NAFTA: Estimated U.S. Job "Gains" and "Losses" by State Over 5 ½ Years*, updated February 2, 2000, pp. 2-3.

[116] CRS Report RS20889, *Textile and Apparel Quota Phaseout: Some Economic Implications*.

[117] U.S. International Trade Commission. *Impact of the North American Free Trade Agreement on the U.S. Economy and Industries: A Three Year Review*, Publication 3045 (July 1997), p. 82.

[118] An updated and more detailed discussion of U.S.-Mexican automotive trade developments is in CRS Report RL32883, pp. 19-23 and 53; Table 5 is taken from that (continued...)

and Canadian automotive industries were already highly integrated following the U.S.-Canada Free Trade Agreement and an earlier U.S.-Canada Auto Pact in 1965, most of the impacts of NAFTA relate to trade liberalization with Mexico. In particular, NAFTA required the removal of Mexico's restrictive trade and investment policies. Mexican tariffs on all types of motor vehicles and parts, which were as high as 20% for some goods, were phased out by 2003. In addition, Mexico agreed to lower or entirely remove investment restrictions in the automotive sector, which provided an incentive to increase U.S. investment in Mexico. The United States eliminated the 2.5% tariff on motor vehicles manufactured in Mexico and phased out the 25% tariff on Mexican light trucks. The United States also phased out tariffs on most Mexican auto parts. Mexico's importance to the U.S. motor vehicle industry has increased as a result.

U.S. motor vehicle exports to Mexico increased from almost nothing in 1990 to $4.1 billion in 2004. But imports from Mexico increased from $2.9 billion in 1990 to $19.1 billion in 2004, representing an increase of 658%, faster than any other major source. By value, motor vehicle imports from Mexico increased from less than 5% to 13.5% of the U.S. total. However, the combined share of Mexico and Canada in the total vehicle and parts import market increased less dramatically, from 40% to 48%. As for U.S. exports the North American partners have been the biggest U.S. market for vehicles and parts, both before and after NAFTA, as their share was 73% in both 1990 and 2004. The major change, as mentioned above, is in the increased role for Mexico as a market for U.S. vehicle exports.

Table 5. Details of U.S. Automotive Trade

(All totals in billions of dollars)

Trading Partners	1990		2000		2004	
	Exports	*Imports*	Exports	*Imports*	Exports	*Imports*
Canada — Vehicles	8.1	*20.4*	14.9	*40.9*	18.4	*46.5*
— Auto Parts	13.7	*9.1*	29.6	*17.6*	29.9	*19.2*
Mexico — Vehicles	0.3	*2.9*	3.8	*21.0*	4.1	*19.1*
— Auto Parts	4.3	*4.5*	12.6	*18.2*	11.3	*21.4*
NAFTA Totals: — Vehicles	**8.4**	***23.3***	**18.7**	***61.9***	**22.5**	***65.6***
— Auto Parts	**18.0**	***13.6***	**42.2**	***35.8***	**41.2**	***40.6***
European Union* — Vehicles	1.7	*9.3*	2.2	*22.2*	6.1	*31.0*
— Auto Parts	1.9	*4.6*	4.8	*7.7*	4.6	*10.9*
Japan — Vehicles	0.9	*23.9*	0.8	*32.6*	0.5	*32.9*
— Auto Parts	0.9	*10.4*	2.2	*14.5*	1.5	*15.4*

[118] (...continued)
report.

Korea — Vehicles	0.1	*1.1*	0.0	*4.9*	0.1	*10.0*
— Auto Parts	0.2	*0.7*	0.5	*1.1*	0.5	*1.9*
China — Vehicles	0.0	*0.0*	0.0	*0.0*	0.1	*0.1*
Auto Parts	0.0	*0.1*	0.2	*1.6*	0.6	*3.8*
World — Vehicles	**13.6**	***60.6***	**24.7**	***127.0***	**34.6**	***141.8***
— Auto Parts	**22.9**	***31.7***	**53.7**	***67.0***	**52.6**	***80.4***

Source and Note for Table 5: U.S. International Trade Commission. *Trade Dataweb*, from U.S. Harmonized Tariff Schedule, using Dept. of Commerce definitions.
* Includes the 15 members of the European Union as of January 1, 1995, for all data years.

China's Accession to the WTO. On December 11, 2001, after 15 years of negotiations, China formally joined the WTO, the international institution that administers multilateral trade rules and serves as a forum to negotiate trade agreements. In joining the WTO, China agreed to substantially liberalize its trade and investment regimes over a number of years. The WTO accession agreement required China to take a number of trade liberalization measures over stated time periods to reduce a wide variety of tariff and non-tariff barriers. China agreed to cut overall average industrial tariffs from 24.6% to 9.4% by 2005 and to cut average tariffs on information technology products from 13.3% to zero by 2005.[119]

In industrial goods in general, China agreed to reduce tariffs from a base average of 25% (in 1997) to 7%. China also agreed to participate in the Information Technology Agreement, requiring the elimination of tariffs on computers, semiconductors and other information technology products. China agreed to eliminate these tariffs by January 1, 2005.[120] China agreed to eliminate all subsidies on industrial goods, such as export subsidies and import substitution subsidies, that are prohibited under WTO rules. In the automotive sector, China agreed to reduce tariffs on autos from 80-100% to 25% by July 1, 2006. In auto parts, tariffs are to be reduced by an average of 17.4% to an average of 9.5% by July 1, 2006. China pledged to phase out quotas on autos by January 1, 2005, and allow U.S. financial firms to provide financing for the purchase of cars in China. Prior to its accession, China did not generally permit foreign companies to distribute products through wholesale and retail systems in China, or to provide related distribution services such as repair and maintenance services. China agreed to phase out these prohibitions over three years for most products, including autos and auto parts.[121]

China will reduce its tariffs on textile and apparel products from an average tariff of 20.1% to 11.5%. China eliminated its previous system of quotas on U.S.

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[119] CRS Report RS20139, *China and the World Trade Organization*. For a broader look at U.S.-China trade relations, see CRS Issue Brief IB91121, *China-U.S. Trade Issues*.

[120] United States Trade Representative, *China's Accession to the World Trade Organization (WTO)*. See [http://www.ustr.gov/regions/china-hk-mongolia-taiwan/accession.shtml].

[121] U.S. Department of Commerce, International Trade Administration, Office of China Economic Area, *Industry Fact Sheets: Autos and Auto Parts*. See [http://www.mac.doc.gov/China/Docs/industryfactsheets/autos.html].

textile exports and agreed to establish a tariff-rate quota system for some textile products. The United States agreed to apply the WTO Agreement on Textiles and Clothing (ATC) to China, in which China agrees to phase out its quotas on textile products. Under the agreement, all textile and apparel quotas were phased out over a 10-year period, with full elimination of quota restrictions on WTO members occurring in January 2005. China's phase-out period will be faster since it joined the agreement at a much later date. The United States and other importing countries retained a right to apply special safeguard mechanisms exclusively to China for specified periods, if warranted by import surges. As noted above in the subsection on textiles and apparel, the Bush Administration has initiated such safeguards with respect to increases in imports of some textile and apparel products.

The overall effect on U.S. manufacturing of China's accession to the WTO is still uncertain. U.S. trade barriers are generally low. Reforms in China's trade and investment regulations, which are usually more restrictive, may have contributed to increased U.S. exports. China's entry into the WTO requires significant reforms to its trade regime, including a reduction in foreign investment restrictions, which have resulted in significant new opportunities for U.S. exporters and for U.S. investment in China. The liberalization of foreign investment regulations in China could provide an incentive for U.S. manufacturing firms to relocate production facilities to China. As discussed earlier, many U.S. producers have complained that trade with China has become progressively more unbalanced as a result of China's maintaining an undervalued currency exchange rate.[122]

Some analysts argue that China's entry to the WTO will accelerate the rising trade deficit with China and severely affect employment in manufacturing, the sector most likely to be adversely affected by trade.[123] While economists generally believe that trade deficits in the United States have not hampered the overall creation of jobs, they do influence the types of jobs that are created because of the trade-related changes in composition of U.S. output.[124] The United States has had a rising trade deficit with China since the late 1980s, long before China's entry to the WTO. In 2000, the year prior to China's accession to the WTO, the United States had a merchandise trade deficit with China of $83.8 billion. By 2002, the trade deficit had increased 24% to $103.1 billion, and by 2004 it was $161.9 billion. Increases in U.S. imports from China since 2001 cannot be attributed entirely to China's WTO accession. The accession may *accelerate* changes in trade and investment, particularly in certain industries, but these effects are not easily measured.

A study by the U.S. International Trade Commission on the effects on the U.S. economy of China's accession to the WTO estimated the effects of the removal of China's trade barriers. The study found that U.S. exports to China and U.S. foreign

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[122] See CRS Report RS21625, *China's Currency Peg: A Summary of the Economic Issues*.

[123] See Economic Policy Institute, *The High Cost of the China-WTO Deal*, February 16, 2000.

[124] In the 1990s, the overall U.S. trade deficit increased considerably while the U.S. economy expanded and full employment levels were attained. For more information see CRS Report RL30534, *America's Growing Current Account Deficit: Its Cause and What it Means for the U.S. Economy*, by Craig Elwell.

investment in China were likely to increase as a result of China's removal of non-tariff barriers. Non-tariff trade barriers were part of China's industrial policy to achieve economic development of specific industry sectors. The ITC study found that because the number of non-tariff barriers overlapped across industries, it is difficult to isolate the effect of an individual barrier or the impact of removing one barrier relative to another. The report stated that U.S. manufacturing industries would benefit from the following changes in China's non-tariff trade regulations: new official rules and mechanisms for technology transfer and the protection of intellectual property rights; elimination of China's export performance requirements; and the removal of domestic content requirements.[125]

The textile and apparel industries may be among the manufacturing industries most likely to be affected. The ITC study examined the impact of China's participation in the ATC and estimated that the overall effect on the U.S. economy would be positive but that U.S. apparel producers would experience the more adverse effects. The study estimated that the United States would experience economy-wide welfare gains of $2.6 billion in 2006, and a GDP increase of about $1.9 billion. This was projected to occur from efficiency gains from factor reallocation in the U.S. economy, and from lower-priced goods imported into the United States. The results of the study predicted that China's participation in the ATC would likely have a small impact on U.S. imports of textiles and a larger effect on U.S. imports of apparel. The study suggested that the increase in China's exports of textiles and apparel would likely come at the expense of other suppliers to the U.S. market, but that the U.S. textile and apparel industries could also be affected. This study predicted that the most serious adverse effects would likely be experienced after December 31, 2004, the end of the phase-out period, but, as noted earlier, the Bush Administration has already initiated certain safeguard actions on imports of Chinese textile and apparel products.[126]

These findings on textiles and apparel, if applied more broadly to the full range of consumer goods, reinforce the view expressed to Congress in 2003 testimony by Gregory Mankiw, then Chairman of the Council of Economic Advisers (CEA). He noted that 60% of U.S. imports from China consisted of consumer goods, and only 28% of capital goods, while 47% of U.S. exports to China were capital goods. Mankiw argued that this is compatible with the comparative advantage of each country, with China specializing in "items that are relatively intensive in the use of less-skilled labor," while U.S. manufactured exports "tend to be goods that are made by relatively high-skilled workers ..." Mankiw further noted that, while imports from China increased as a percentage of total U.S. imports, the percentage of imports from other Pacific Rim countries had fallen, leading him to conclude that the major impact was displacement of imports from the other Asia countries. Moreover, Mankiw stated, the share of the increase in the U.S. trade deficit since 1997 accounted for by

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[125] U.S. International Trade Commission, *Assessment of the Economic Effects on the United States of China's Accession to the WTO,* Publication 3228, August 1999.

[126] *Ibid.*

trade with China was less than that of Mexico and of the 12 countries in the euro area.[127]

Industrial Policy and Industrial Competitiveness Policy[128]

Worldwide, there is a long tradition of government intervention in economies to guide market decisions. These policies have ranged from protectionist trade policies to promote export-led growth, or growth through import substitution, to national economic planning systems in which a government co-ordinates the structure of the economic system, or picks winning industries and firms to champion. There are also a vast array of targeted subsidies, preferential loans, research and development subsidies, and tax incentives designed to improve the performance of the economy, or a specific sector, to achieve higher growth, higher employment, and trade surpluses. Over time, these policies have gained the collective name industrial policy.

Industrial policy may take the form of a formal system supported by a government agency or department, or a collection of policies that may simply be identified as such. In a broad sense, every nation has an industrial policy simply through the existence of policies which affect firms, industries, and markets. In many cases these policies are uncoordinated and sometimes contradictory. Interest in industrial policy peaked in the 1980s as the seeming economic success of Japan and other Asian nations suggested to many that a new form of market capitalism might be on the rise. The failure of Japanese economic policies from the 1990s to the present, the Asian financial crisis of the late 1990s, as well as the success of the more free market oriented United States economy in the 1990s, caused interest in various forms of industrial policy to diminish.

Planning in Market Economies

Japan and France are examples of democratic nations that have instituted more formalized versions of industrial policy. Both nations emerged from World War II with shattered economic and industrial structures. Each established government agencies to guide and coordinate reconstruction decisions. Japan set up the Ministry of International Trade and Industry (MITI) while the French created the Planning Commission. From the late 1940s until the oil shock of 1973 both nations experienced substantial economic growth and made major strides in rebuilding their economies.

MITI provided formal and informal guidance to industries on modernization, technology, investment strategy and domestic and international competition. This was accomplished through a consensus-based policy which drew together industrial, financial, and government components to accomplish national industrial and foreign

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[127] House Committee on Ways and Means. "Statement of N. Gregory Mankiw, Chairman, Council of Economic Advisers," October 30, 2003, pp. 3-6.

[128] This section was written by Robert Pirog and Stephen Cooney.

trade goals. MITI provided protection from import competition, technological intelligence, assistance in licensing foreign technology. It also assisted in expediting mergers, coordinating investment, and obtaining foreign exchange.[129] Through the use of these policies MITI gained the reputation, at least outside of Japan, of being effective at picking winning industries to encourage. The MITI -led Japanese model, often referred to as "Japan, Inc.," highlighted economic growth led by the export oriented sectors of the economy. A foreign trade policy that restricted imports and encouraged exports led to the accumulation of trade surpluses which provided substantial reserves of capital to finance further development.[130]

After World War II the French instituted a system called indicative planning. The Planning Commission created committees of major firms, public enterprises, unions and technical experts to exchange information and set consistent goals for the relevant industry, and ultimately the French economy. While the Planning Commission did not engage in mandatory, centralized planning, it exerted significant influence on economy in the hope of rationalizing economic decisions.[131]

The economic performances of both Japan and France deteriorated, even while their planning functions continued to operate. Japan achieved strong economic growth until the 1990s when its economy entered a period of stagnation from which it has yet to recover. French economic difficulties began in the late 1970s and continued into the early 1990s. During this period the French economy also went through periods of nationalization and denationalization, as well as integration into the European Union.

While the economy was performing well, MITI was given credit for skillfully orchestrating Japanese ascendency in a number of key export oriented industries. More recent analysts have begun to question MITI performance. MITI did not see the commercial value of transistors and worked to discourage Sony from acquiring production rights from Western Electric. MITI thought there were too many automobile firms in Japan and tried to encourage mergers which would only have left two firms, Nissan and Toyota. Japanese banking practices and provision of capital to industry were critical to the consensual capitalist model favored in the 1980s, but for the past decade Japanese banks have been overburdened with non-performing debt which has been a major drag on the financial system.[132]

The issue these, and other, incidents highlight is the role of information and choice in a market economy. Can government agencies make better resource allocation decisions than individual market participants? The Japanese and French

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[129] Daniel Yergin and Joseph Stanislaw, *The Commanding Heights* (New York: Simon and Schuster, 1999), pp. 164-65.

[130] An alternative view is that Japanese development was fueled by a high domestic savings rate relative to investment. The two sources of surplus are linked by the simple macroeconomic equilibrium condition S-I =X-M where S is savings, I is gross domestic investment, X is exports, and M is imports. The two approaches are broadly compatible assuming the existence of appropriate transfer mechanisms within the economy.

[131] Yergin and Stanislaw, pp. 27-32.

[132] Karl Zinsmeister, "MITI Mouse," *Policy Review* no. 64 (Spring 1993), pp. 28-36.

experiences suggest the difficulties that nations might experience over time. Both nations have recast their national industrial planning efforts. Both MITI and the Planning Commission have been reorganized and have focused their efforts on public policy analysis and away from direct targeting and planning.[133] In Japan, MITI has been reconstituted as METI, the Ministry of Economy Trade and Industry. The "key points" of its 2004 "Economic and Industrial Policy" focused on macroeconomic performance and competitiveness of Japanese markets.

But aspects of these industrial policy approaches persist. For example, METI reportedly continues to be involved in a more limited way in actively supporting Japanese semiconductor industry R&D activities.[134] A similar supportive role is being played by the Korean government toward its semiconductor industry.[135] A study prepared for the U.S. Semiconductor Industry Association on China's semiconductor industry, cited above, notes a distinctive Taiwanese model of industrial policy, which is being explicitly integrated into the Chinese context by the present government of China:

> ... [A]ll of Taiwan's principal policies in this sector are now being closely paralleled on the mainland — tax holidays, the establishment of science-based industrial parks, spinoff of government research institutes, preferential lending, promotion of semiconductor foundries, lucrative financial incentives for key personnel, and passive government minority investments in semiconductor enterprises.[136]

Other countries reportedly are engaging in bailout policies to preserve traditional industries that have fallen on hard times. A single recent edition of the *Financial Times* carried articles regarding criticisms of such policies in China and Europe. U.S. Secretary of Commerce Don Evans was reported as telling the Chinese government that it should end "its system of state subsidies by ceasing to provide loans from state-owned banks to unprofitable state-owned businesses." State businesses were estimated to provide about 50 million jobs in China, a large portion of the urban workforce. Meanwhile, the European Commission reported that European Union member states subsidized 120 service and manufacturing companies during the period 1999-2002. The French commitment to bail out the electrical engineering firm Alstom could cost up to $2.4 billion. Germany, France, Italy, and Spain were cited as responsible for 85 of the 120 European subsidy cases.[137]

While the United States has never had an overall industrial policy, it, like virtually all nations, has engaged in policies to enhance the performance of various sectors of the industrial economy. For example, in response to the changing market

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[133] See the website [http://www.meti.go.jp/english/policy/index_metipolicies.html] (Viewed on October 6, 2003).

[134] Yoshiko Hara, "Japan Pins a Rebound on Joint R&D in Post-PC Era," *Electronic Engineering Times* (Oct. 13, 2003).

[135] *Korea Herald*, "Korea Scrambling to Develop Next- Generation Chips" (Oct. 20, 2003).

[136] Howell *et al.*,*China's Emerging Semiconductor Industry*, ch. 2. Quotation is on p. 50.

[137] David Dombey, "Brussels Pinpoints EU States Most Likely to Bail Out Failing Groups," (p. 4) and "U.S. Steps Up Rhetoric Against China State Aid," (p. 11) both in *Financial Times*, Oct. 28, 2003.

for semiconductors and a decline in U.S. manufacturers share, SEMATECH, described earlier, was formed in 1987 as a consortium of 14 U.S.-based semiconductor manufacturers and the U.S. government, with financial support from the Defense Department. The consortium sought to solve common manufacturing problems through leveraging resources and sharing risk. By 1994 SEMATECH had determined that the U.S. industry's strength and market share were sufficient, and it wanted to increase international participation in projects. It therefore decided to end its acceptance of federal funding after 1996.[138]

There have been other sectoral programs of this type attempted or developed in the United States, which included federal investment or participation, and direct or indirect spinoff benefits for the private sector. Concerned about reliance on foreign sources for flat-panel displays critical in some military applications, for example, the Defense Department attempted to support a U.S. manufacturing presence in this technology in the 1990s, but eventually abandoned this effort. On a wider scale, the Department of Commerce National Institute of Science and Technology sponsors the Advanced Technology Program (ATP), which cost-shares the funding of technology R&D proposals, selected on a competitive basis, which appear to have significant commercialization potential.[139] Although authorized at higher levels in the mid-1990s, average funding for the program in recent years has been about $200 million annually, and the Bush Administration has proposed terminating it altogether.[140] The National Academies Board on Science, Technology and Economic Policy in May 2003 presented a briefing for Congress and staff, at which some participants suggested consideration of a renewed government-industry partnership to enhance advanced U.S. R&D activities critical to the semiconductor industry, especially in view of the recent industry downturn and lagging private sector resources.[141]

Such targeted programs frequently aim to assist industries in improving efficiency and productivity. They may preserve or create some manufacturing jobs in the near term. One concern with these policies is that, in the longer term, if they succeed in improving worker productivity, a consequence may be reduced employment in the specific industry targeted, even as the overall economy benefits. American manufacturing has shown gains in productivity since the employment peak in 1979. It may be that the strong growth in worker productivity, coupled with a low income

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[138] *History of the Consortium,* SEMATECH Corporate Information, 2003, available at the website [http://www.sematech.org/public/corporate/history/history.htm]. This policy issue is also summarized in CRS Report RL31708, *Semiconductors: The High-Technology Downturn and Issues in the 108th Congress*.

[139] Such programs were a major component of the Clinton Administration's approach to U.S. technology policy. For an update on the status of the ATP and another Commerce Dept. program to assist small and medium-sized manufacturing companies, see CRS Report 95-36, *The Advanced Technology Program* and CRS Report 97-104, *Manufacturing Extension Partnership Program: An Overview*, both by Wendy H. Schacht.

[140] *Budget of the U.S. Government. Fiscal 2004: Analytical Perspectives*, p. 180.

[141] National Academies Board on Science, Technology and Economic Policy. "Future of the U.S. Semiconductor Industry," briefing, May 8, 2003. Background for the briefing was provided in the comprehensive review, *Securing the Future: Regional and National Programs to Support the Semiconductor Industry*, Charles W. Wessner, ed. (Washington, DC: National Research Council, 2003).

elasticity of demand for manufactured goods, is responsible for a significant share of the secular decline in manufacturing employment.[142] The huge advantage China holds in terms of access to low cost labor, for example, is unlikely to be reversed by policies that enhance the productivity of U.S. workers. In cases where low foreign wage costs are the key factor in location decisions, the required increases in productivity would have to be large enough to overcome the differences in U.S. wages and benefits.

In citing the five industries that have contributed most significantly to U.S. manufacturing job losses since 2000, former CEA Chairman Mankiw noted that the leading industry as a source of job losses was computer and electronic equipment (16% of total losses), and semiconductors and components ranked fifth (7.5%). These two industries are in high-technology fields, have high rates of manufacturing productivity growth, and have benefitted from direct and indirect federal R&D support. By contrast, the other three leading industries, contributing just under 11% of total manufacturing job losses each, were more traditional industries (machinery, fabricated metal products and transportation equipment).[143] This comparison would seem to attenuate a connection between programs to target industry R&D support, and job creation and preservation, although such policies may well have other benefits to commend them.

[142] Income elasticity refers to the responsiveness of demand for manufactured goods in response to an increase in society's income. This point is made in the study by John A. Tatom referred to earlier in this report.

[143] Mankiw, House Ways and Means Committee testimony, p. 7.

Industrial Competitiveness Policy

The Organization for Economic Cooperation and Development (OECD) issued a policy brief in 1997 which addressed the issue of industrial policy among member nations.[144] The OECD determined that while many members had pursued targeted industrial policy based on either geographic or sectoral targets, by the late 1990s the focus had shifted to making the economy as a whole more conducive to market transactions.

The OECD report identifies several reasons for this change in philosophy. The globalization of the world economy and the opportunities available as a result, changed the strategic focus of enterprises. Companies increasingly view the market for inputs, labor and capital, as well as outputs, on a global scale, depending less on the national market. Liberalization of world trade and capital flows made international markets far more open to competition. The development of a knowledge-based economy, supported by high technology inputs, made the sectoral industrial policy goals of supporting traditional, aging, industries appear increasingly costly.

Modern industrial competitiveness policy focuses on the economy as a whole. Initiatives designed to improve a nation's business environment, streamlining or eliminating some forms of regulation, reducing impediments to trade and investment flows, and encouraging research and development have replaced targeted policies. To the extent that subsidies are provided, they tend to encourage investment in new markets, rather than investing to shore up declining industries.[145]

Other key parts of industrial competitiveness policy include the reform of corporate structure and practices and corporate governance. These are important elements in encouraging transparency in markets. Capital is less likely to flow through markets where the perception exists that results are rigged, or the data provided about firms' financials are not accurate. In today's market, the inability to access capital is a significant liability to economic performance.

Conclusion and Outlook[146]

The first part of this report showed that, in terms of productivity and output, U.S. manufacturing remained strong and competitive between 1991 and 2000. Its real output has tripled over the past generation, and grew by 30% in the latter period, which represents a peak-to-peak comparison. While there have been major divergences among different industry sectors, such divergences may be regarded as part of the process of transition and industrial transformation in the economy. The economic downturn after 2000 may be regarded as essentially a cyclical event, in

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[144] *New Directions in Industrial Policy,* OECD Policy Brief, No.3-1997, available at [http://www1.oecd.org/publications/Pol_brief/1997/9703_pol.htm] (Viewed on September 29, 2003).

[145] *Ibid.*, pp. 2-7.

[146] This section was written by Stephen Cooney.

which recovery was impeded by some unique events, such as the 9/11 attacks and the uncertainties of the Iraq war, and during which there also were present some elements of structural change.

Among the industries studied in detail in this report, textiles and apparel have demonstrated the most negative performance in terms of job loss, and the termination of the remaining textile import quotas has placed even stronger international competitive pressure on the industry. The information technology products manufacturing industry, especially semiconductors, was, by contrast, able to regain and maintain its overall global leadership position, though it did shed jobs after the "dot.com bust" and will face future challenges. The automotive industry has remained strong in the United States, though the domestic industry has changed dramatically in structure and the U.S. trade balance in automotive products has continued to worsen. The traditional "Big Three" domestic manufacturers (and one of the Big Three is now controlled by a foreign-based company) have been challenged by the growth of foreign-owned "transplant" production, especially in passenger cars. Now Toyota and Nissan are also making inroads into the light truck market.

The overall manufactures trade balance has moved sharply in a negative direction, at an alarming rate according to some analysts. They note that it is the largest component in the deterioration in the overall U.S. trade account. Manufactured imports exceeded $1 trillion annually in recent years, and are now 50-60% higher annually than the level of exports. This development may be ascribed in some degree to the high exchange rate of the dollar between 1996 and 2002, a problem which could be alleviated by recent moderating trends. However, while concern is often expressed about the trade deficit and "foreign outsourcing" of U.S. manufacturing jobs, it is not often noted that manufacturing employment is declining in virtually all major industrial countries, as well as many developing countries, especially China.

Thus, decline in manufacturing employment is not a uniquely American or "mature" industrial country phenomenon. It may be considered as part of the process of global adjustment to new patterns of production, trade and the international division of labor, encouraged by dramatic real-time industrial management changes made possible by information technology advances and trade liberalization.

This is not encouraging to U.S. manufacturing workers who have lost their jobs, to the communities where they live, and, in many cases, to their former employers who have not been able to adapt to the new globally competitive environment. Since 1950, manufacturing employment has declined from 30% of all non-farm jobs to less than 15%. Unionization levels have declined by similar levels since 1982, and have fallen in all fields, except government employment. By 2004, there were fewer than 15 million manufacturing workers in the United States, almost five million fewer than the all-time peak in 1979, and fewer than in 1950. And measured as a share of current-dollar U.S. GDP, manufacturing output has declined from about 30% to about 15% since 1960.

While this last statistic reflects the efficiency and productivity of U.S.-based manufacturing, constant competitive pressures may be encouraging manufacturing

employers to cut their workforces or to move production to other locations. The conclusion from this perspective is that manufacturing employment, like agriculture before it, is declining relatively and absolutely in the United States, and more rapidly in the last three years.

The view of the Bush Administration, as outlined in a September 2003 speech by then-Secretary of Commerce Don Evans, is that the present market-based system, with minimal government intervention in the economy, can be adjusted and reinforced at certain points to provide an adequate response to actual or prospective losses of U.S. competitiveness.[147] As part of its investigation into the condition of U.S. manufacturing, the Commerce Department conducted a total of 23 "roundtables" with groups representing manufacturing sectors or specific topics of interest.[148] *Manufacturing in America* summarized in its second chapter what the Commerce Department reports as those policy areas that manufacturers themselves believe "require immediate attention ... to ensure the competitiveness of U.S. manufacturing."

The report says that manufacturers want, first, a greater "focus within government on manufacturing and competitiveness." That said, they reportedly also asked for stronger policies to promote growth both at home and abroad. As part of the more concentrated focus, the manufacturers were also said to ask for more assistance from government in controlling costs that are coincidental to manufacturing, such as taxes, health care costs, the costs of regulatory compliance, especially with respect to environmental issues, and the costs of various liabilities faced by manufacturers.[149] The manufacturers were also reported as urging greater government commitment to encourage private sector research and development, as well as in bringing innovations to market. More broadly, the report continued, "manufacturers seek a renewed emphasis from all levels of government to invest in education and training institutions." Finally, the report emphasized that manufacturers seek international trade and monetary policies that create a "free, fair and open" competitive environment. This means with respect both to opening foreign markets, and to eliminating unfair competition from foreign producers abroad and in the domestic U.S. market.[150]

The last part of *Manufacturing in America* laid out recommendations for addressing the challenges raised by U.S. manufacturers. These included making recently approved tax relief measures permanent, and making permanent the tax

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[147] Secretary of Commerce Don Evans. "Remarks to the Detroit Economic Club," (Sept. 15, 2003).

[148] The "roundtables" were held between April and September 2003, and are listed, with names of participants, in the appendix to *Manufacturing in America*.

[149] In addition to the Commerce Department report, a detailed analysis of the impact of such issues, prepared for the Manufacturers Alliance and the Manufacturing Institute of the National Association of Manufacturers, is in Jeremy A. Leonard, *How Structural Costs Imposed on U.S. Manufacturers Harm Workers and Threaten Competitiveness* (December 2003).

[150] The input from the roundtables is summarized on pp. 33-34, with details elaborated in pp. 34-58 of *Manufacturing in America*.

credit for research and development. It also included controversial initiatives supported by President Bush regarding class action lawsuits,[151] medical liability, pension reform and a national energy strategy. The report introduced some new initiatives in federal support for private sector innovation and R&D, of which the most concrete was greater Commerce Department coordination with the established Manufacturing Extension Partnership (MEP).[152] These initiatives included a review of existing federal programs that invest in manufacturing R&D to "establish priorities designed to improve U.S. manufacturing technology." The report also emphasized the opening of international markets through future trade agreements, as well as tougher enforcement of U.S. trade laws.[153]

The report specifically proposes a reorganization and strengthening of the Commerce Department's international functions to strengthen both export promotion and enforcement policy against unfairly traded imports.[154] It proposed creation of the position of "Assistant Secretary for Manufacturing and Services," who would be "the principal point of contact with the manufacturing sector" and would assist the Secretary of Commerce "in his role as the federal government's chief advocate for the manufacturing sector."[155] The position was subsequently established with Albert Frink, a California business owner and manufacturer, appointed and confirmed as the first incumbent.

The 108th Congress considered tax policy changes that may have important consequences for U.S. manufacturing. The WTO has declared both the former U.S. system of "Foreign Sales Corporations" and its replacement by an extraterritorial income (ETI) provision of the tax code as illegal export subsidies. The European Union received authorization for imposing retaliatory tariffs against more than $4 billion in U.S. exports, if the law had not been changed. In October 2004, Congress approved the American Jobs Creation Act, which made tax law changes in response to this case, as well as a number of other corporate tax law changes. The bill was signed into law (P.L. 108-357) by President Bush on October 22, 2005.[156] Among other issues, Congress approved, and President Bush signed into law, the Trade Act

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[151] Legislation that would control and restrict class action lawsuits by shifting some suits from state to federal jurisdiction, and making other reforms, was passed in the 109th Congress and signed into law by President Bush as P.L. 109-2 on Feb. 18, 2005. See CRS Report RL32761, *Class Action and Legislative Proposals in the 109th Congress: Class Action Fairness Act of 2005*.

[152] For more information on the MEPs, see CRS Report 97-104, *Manufacturing Extension Partnership Program: An Overview*.

[153] These recommendations are discussed in *ibid.*, pp. 62-79. The list of recommendations are also summarized under "Recommendations" in the summary under the Commerce Department website (www.commerce.gov).

[154] *Ibid.*, pp. 77-79.

[155] *Ibid.*, pp. 60-61.

[156] CRS Report RL32652, *The 2004 Corporate tax and FSC/ETI Bill: The American Jobs Creation Act of 2004*.

of 2002 (P.L. 107-210), which expanded and enhanced assistance through the Trade Adjustment Assistance program to workers dislocated by import competition.[157]

U.S. manufacturing may, however, be affected by more than cyclical problems or the types of international and domestic issues addressed in the Commerce Department recommendations and related legislative measures. The secular decline in manufacturing employment, the inability of the economy to generate new manufacturing jobs in the early stages of the last two U.S. domestic economic recoveries, and the growth of a huge and possibly permanent manufactures trade deficit could be caused by many factors. These could include a mismatch between the skills, abilities and education of workers leaving one industry and those required by another. There may also be a reluctance of workers to move from one geographical region to another, or to embark on an entirely new career at an older age.

The economist Joseph Stiglitz has described unemployment and under-utilization of industrial capacity as "perhaps the most widely recognized symptoms of 'market failure.'" As Stiglitz then continues, so-called "market failure" may occur for a variety of reasons. "The fact that markets have failed to produce full employment ... does not in itself imply that there is a role for the government to play; one must be able to show, in addition, that there are policies through which the government can improve the functioning of the economy."[158]

This may be considered by some to justify a more active government role in the economy than contemplated by the Bush Administration.[159] For example, proposals have included more far-reaching efforts to improve worker skills, to promote manufacturing innovation through increased private-public sector partnerships, to restore and develop public infrastructure and to encourage domestic manufacturing activities considered strategic, for reasons of national security or national economic development. But proposals of this type also imply other costs, both in terms of direct expenditures and the indirect reallocation of resources. Such efforts can support manufacturing, but possibly at the expense of the overall economy.

Appendix: Change in Industrial Classification System[160]

The Standard Industrial Classification (SIC) system provided the structure for categorizing, collecting, aggregating, presenting, and analyzing data on the U.S.

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[157] TAA is summarized in CRS Report 94-478, *Trade Adjustment Assistance for Workers: A Fact Sheet*, by Paul J. Graney.

[158] Joseph E. Stiglitz, *Economics of the Public Sector* (New York: W.W. Norton & Co., 1986), pp. 83-95. The quotations are from p. 91.

[159] Congress has frequently considered "countercyclical" programs to create jobs during recessions, but has enacted no such major programs since 1983; see CRS Report RL31138, *Countercyclical Job Creation Programs of the Post-World War II Era*, by Linda Levine.

[160] The appendix was written by Bernard A. Gelb.

economy on a logical and systematic basis since before World War II and until recently. It was replaced by the North American Industrial Classification System (NAICS) effective October 1, 2000.

The development of NAICS grew out of (a) realization that the SIC had become outdated, and (b) negotiations for the North American Free Trade Agreement,[161] when it was found that comparable industry classification systems would be necessary for the three signatory countries — Canada, Mexico, and the United States.

Under the SIC, establishments were classified according to the primary product or group of products they produce or handle, or the primary service they provide. In addition, many industries now prominent — such as computer and software production — of course either did not exist or constituted an insignificant part of the economy. The NAICS classifies according to the activity that an establishment is primarily engaged in; establishments using similar raw materials, capital equipment, and labor are classified together. In addition, the NAICS reorganizes the structure of the SIC to reflect the current structure of the U.S. economy, including the introduction of new industry or sector categories — such as computer and software manufacture and "Information" (which includes publishing, motion picture and sound recording, broadcasting, telecommunications, information services, and data processing).

October 1, 2000, was the first date that data began to be collected according to the NAICS structure. Unavoidably, the switch is resulting in breaks in comparability — some substantial — in time series between the SIC and the NAICS periods. Most federal government data collecting and/or publishing agencies have begun to revise their SIC-based series in order to produce complete comparable series. At this writing, this large undertaking is far from complete in most cases, and thus necessitates the use of the SIC-based series when an analyst wishes to examine trends of a number of years ago.

[161] The North American Free Trade Agreement was signed in 1993, and went into effect January 1, 1994.