

# The Manufacturing Sector

The manufacturing sector was affected by the latest economic slowdown earlier, longer, and harder than other sectors of the economy and only recently have manufacturing employment losses begun to abate. Over the past several decades, the manufacturing sector has experienced substantial output growth, even while manufacturing employment has declined as a share of total employment. This chapter examines recent developments and long-term trends in manufacturing and considers policy responses.

The key points in this chapter are:

- The severity of the recent slowdown in manufacturing was largely due to prolonged weakness in business investment and exports, both of which are heavily tied to manufacturing.
- The manufacturing employment decline over the past half-century primarily reflects striking gains in productivity and increasing consumer demand for services compared to manufactured goods. International trade plays a relatively small role.
- Consumers and businesses generally benefit from the lower prices made possible by increased manufacturing productivity, and strong productivity growth has led to real compensation growth for workers. The shift of jobs from manufacturing to services has caused dislocation but has not resulted, on balance, in a shift from “good jobs” to “bad jobs.”
- The best response to recent developments in manufacturing is to focus on stimulating the overall economy and easing restrictions that impede manufacturing growth. This Administration has actively pursued such measures.

## Manufacturing and the Recent Business Cycle

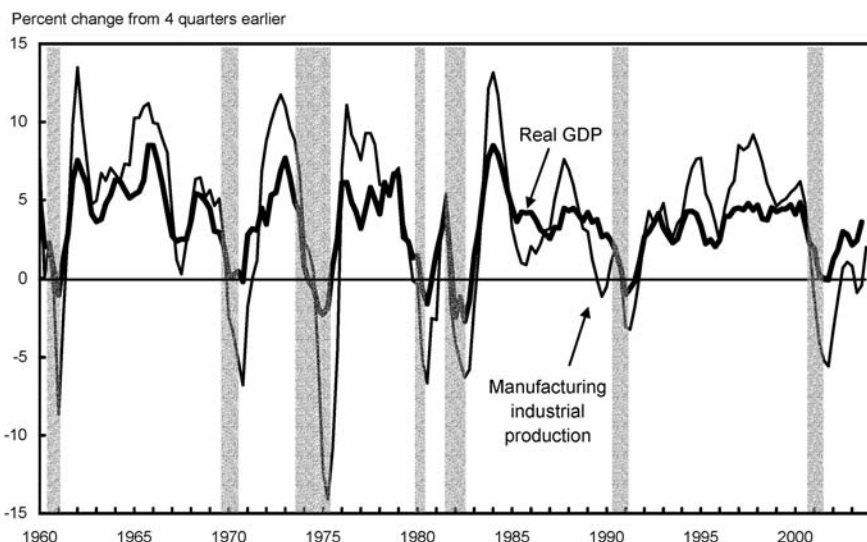
This section looks at the characteristics and causes of the recent economic downturn with particular focus on the manufacturing sector. Output in manufacturing held up relatively well in the recent recession, but employment declined sharply. Data released over the past few months are encouraging regarding the prospects for recovery in the manufacturing sector.

## The Recent Downturn in Manufacturing Output

Manufacturing output dropped 6.8 percent from its peak in June 2000 to its trough in December 2001. This was a larger decline than that for real GDP, which fell only 0.5 percent from its peak in the fourth quarter of 2000 to its trough in the third quarter of 2001. This gap is not out of line with historical experience: manufacturing output has dropped much more than real GDP during past business cycles (Chart 2-1). What is more unusual is that the recovery in manufacturing output has been far weaker than the recovery in real GDP.

As discussed in Chapter 1, *Lessons from the Recent Business Cycle*, investment demand was especially weak during the recent recession. A slowing of demand for equipment investment disproportionately hurts the manufacturing sector because nearly all business equipment involves manufactured products. The rest of final demand, in contrast, involves a mix of manufactured goods, agricultural products, services, and structures. The industries within manufacturing contributing most to the downturn in manufacturing output were those primarily associated with the production of business equipment. In particular, slower growth in production of computers and other electronics, machinery, and metals accounts for nearly two-thirds of the swing in manufacturing output from its rapid growth in the late 1990s (an annual rate of 6.9 percent) to its decline in the 18 months after

**Chart 2-1 Real GDP and Manufacturing Industrial Production**  
Manufacturing industrial production is more volatile than real GDP.



Note: Shaded areas indicate recessions. Recent peak set by Council of Economic Advisers at 2000:Q4.

Sources: Department of Commerce (Bureau of Economic Analysis) and Board of Governors of the Federal Reserve System.

mid-2000 (an annual rate of -4.6 percent). Some parts of manufacturing saw especially difficult times. The metalworking machinery industry, of which the hard-hit tool and die industry makes up 40 percent of employment, has seen its payrolls decline by almost 25 percent from mid-2000 to the end of 2003. Real production in the metalworking machinery industry fell by more than 35 percent over this period.

The timing of the manufacturing slowdown also strongly suggests a link to the decline in business investment (Chart 2-2). Manufacturing output declined substantially in the middle of 2000, months before real GDP turned downward around the fourth quarter of 2000. This pattern mirrors that of business investment in equipment and software, which also peaked in mid-2000—well before the overall economy. The prolonged period of weakness in manufacturing output also bears a notable similarity to the sluggish recovery in investment in equipment and software.

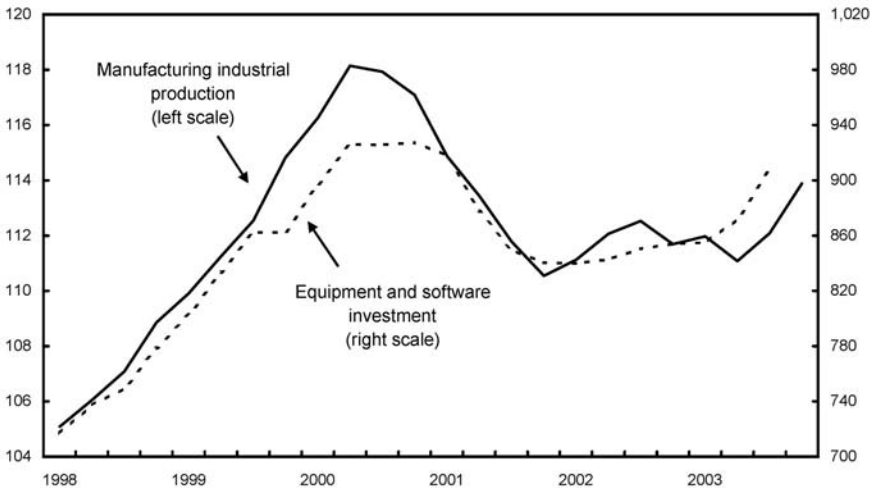
Lackluster demand for U.S. exports has been another source of weakness in the manufacturing sector over the past three years. Exports have been depressed, in part due to slow growth in other major economies. Since the fourth quarter of 2000, the average annual rates of real GDP growth in the euro area and Japan have been less than half that of the United States. Industrial supplies and capital goods make up the bulk of U.S. goods exports. Lower exports of manufactured goods can account for all of the decline in exports since 2000.

**Chart 2-2 Manufacturing Industrial Production and Real Investment**

Manufacturing industrial production has been low, in part reflecting low investment, since the recent recession began.

Index, 1997=100

Billions of chained 2000 dollars



Sources: Department of Commerce (Bureau of Economic Analysis) and Board of Governors of the Federal Reserve System.

# Manufacturing Employment in Recent Years

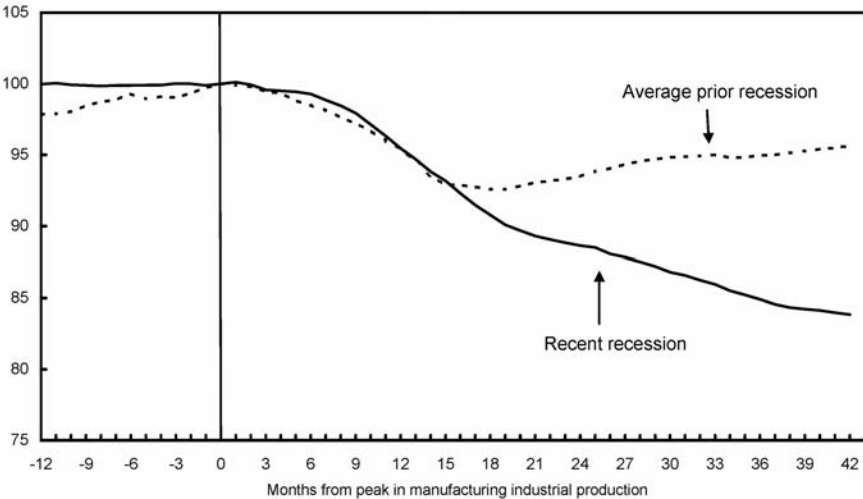
Manufacturing employment declined more than manufacturing output during the recent downturn, just as overall employment declined more than overall output. Manufacturing employment declined 16 percent from June 2000, the peak of manufacturing production, to December 2003—a steeper decline than in recessions on average (Chart 2-3). In fact, the recent drop in manufacturing employment was the largest cyclical decline since 1960.

As with the overall economy, the weakness of manufacturing employment relative to output during and after the recent recession has been reflected in rapid productivity growth (Chart 2-4). From the fourth quarter of 2000 through the third quarter of 2003, productivity in the nonfarm business sector and in the manufacturing sector rose more than 4 percent at an annual rate—appreciably faster than in recessions on average since 1960. This rise has allowed businesses to increase output without a corresponding increase in labor input.

**Chart 2-3 Manufacturing Employment**

Manufacturing employment was particularly hard-hit in the recent recession.

Index, level at manufacturing industrial production peak=100



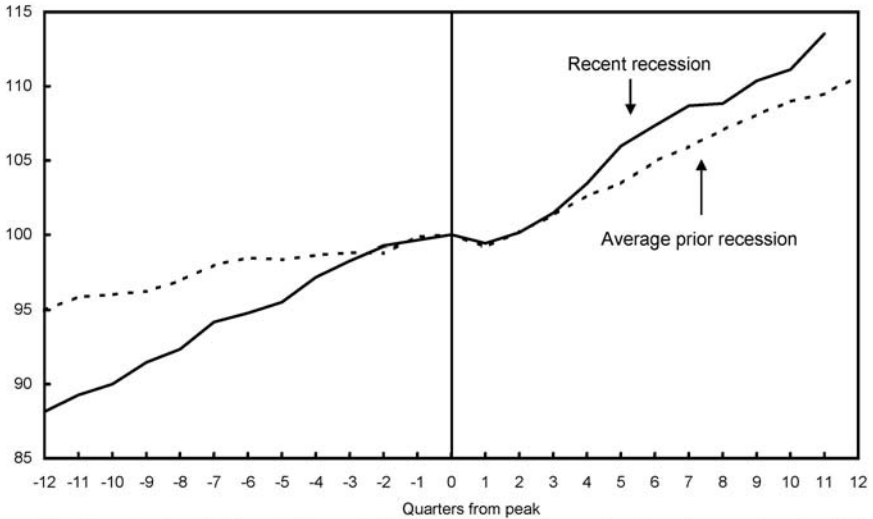
Note: Average based on prior recessions since 1960.

Sources: Department of Labor (Bureau of Labor Statistics) and Board of Governors of the Federal Reserve System.

### Chart 2-4 Productivity in Manufacturing

Manufacturing productivity grew more quickly during the recent recession and recovery than in the average prior recession.

Index, level at business cycle peak=100



Note: Recent peak set by Council of Economic Advisers at 2000:Q4. Average based on prior recessions since 1960. Source: Department of Labor (Bureau of Labor Statistics).

## Signs of Recovery in the Manufacturing Sector

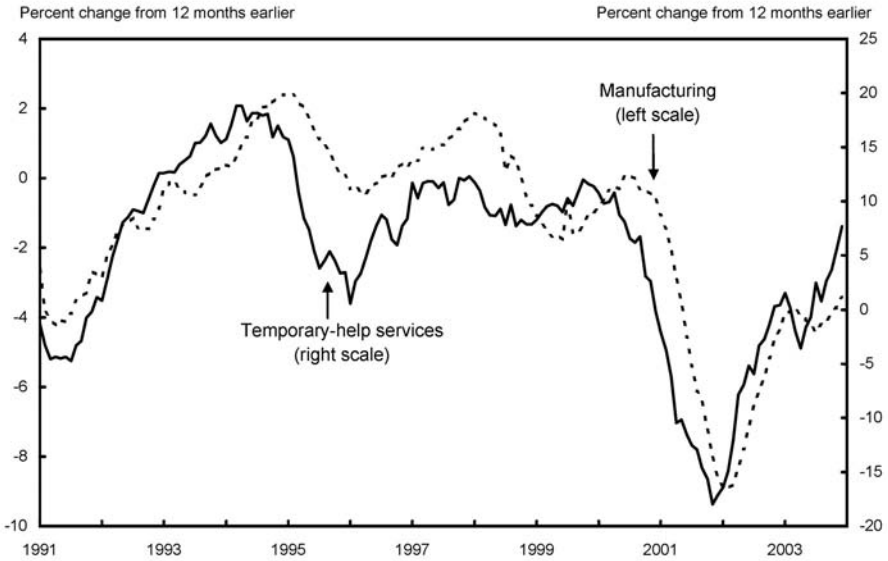
Data for the second half of 2003 suggest a noticeable firming in the manufacturing sector. Orders and shipments of capital goods began to increase around the middle of 2003. Industrial production rose at an average annual rate of 5.9 percent during the second half of the year, the largest six-month gain since the first half of 2000. In addition, the new orders index from the Institute of Supply Management's monthly survey of purchasing managers rose to its highest level in two decades, indicating widespread optimism that activity is picking up. Moreover, some of the factors that have historically affected firms' production decisions support a further strengthening—the cost of capital is low by the standards of the last decade and manufacturers' profits are well above their levels of two years ago.

Although manufacturing employment fell throughout 2003, recent developments hint at improving employment conditions for the sector as a whole. To be sure, some industries continue to lag—for example, textiles, apparel, printing, and petroleum and coal industries have seen employment fall substantially more than overall manufacturing employment since mid-2003. More

broadly, however, the rate of decline in overall manufacturing employment eased noticeably in the fourth quarter of 2003, with the smallest quarterly loss in three years. In addition, the rise in temporary-help services since the spring of 2003 is consistent with a future rebound in permanent employment. The temporary-help sector supplies a substantial share of its workers to the manufacturing sector, and over the past decade has tended to lead movements in the permanent payrolls of manufacturing firms (Chart 2-5).

**Chart 2-5 Employment in Manufacturing and Temporary-Help Services**

Changes in temporary-help services employment tend to lead changes in manufacturing employment.



Source: Department of Labor (Bureau of Labor Statistics).

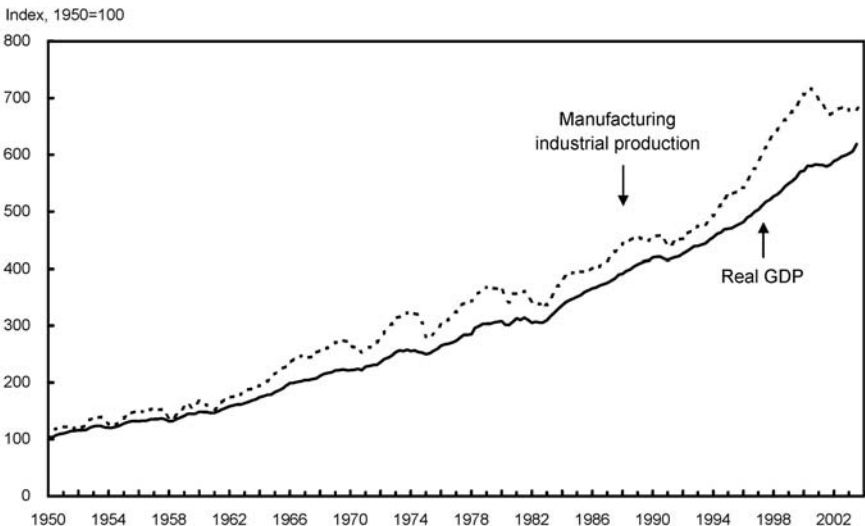
# Long-Term Trends

To place the recent experience of the American manufacturing sector in perspective, this section examines the evolution of the manufacturing sector as a whole over the 50 years from 1950 to 2000 along three key dimensions: output, productivity and demand, and employment.

## Manufacturing Output over the Long Term

Manufacturing output increased dramatically from 1950 to 2000, with particularly strong growth in the 1990s (Chart 2-6). *Manufacturing industrial production*, a measure of real manufacturing output, increased more than sixfold from 1950 to 2000 before declining in the recent recession. Over the same period, annual growth in manufacturing industrial production averaged 3.8 percent, faster than real GDP growth of 3.4 percent. From 1990 to 2000, manufacturing industrial production expanded at an annual rate of 4.6 percent, outpacing real GDP growth by more than a percentage point. Per capita consumption of manufactured goods has also risen: consumption of goods excluding food and fuel more than quadrupled in real 2000 dollar terms from \$1,400 per person in 1950 to \$6,000 per person in 2000.

**Chart 2-6 Real GDP and Manufacturing Industrial Production**  
Manufacturing industrial production increased at a faster rate than real GDP over the period 1950 to 2000.



Sources: Department of Commerce (Bureau of Economic Analysis) and Board of Governors of the Federal Reserve System.

In contrast to real manufacturing output, *nominal manufacturing output* (the dollar value of manufacturing output) has grown more slowly than *nominal* GDP (the dollar value of GDP). As a result, the share of nominal GDP accounted for by manufacturing roughly halved, from 29 percent in 1950 to 15 percent in 2000 (based on GDP by industry data available when this *Report* went to press; that is, prior to the 2003 benchmark revision of the National Income and Product Accounts).

## Manufacturing Productivity and Demand over the Long Term

Two factors are driving the declining share of manufacturing in U.S. nominal output. First, and most significant, productivity growth in manufacturing lowered the relative price of manufactured goods, but demand did not respond proportionately. Second, imported manufactured goods increased their market share.

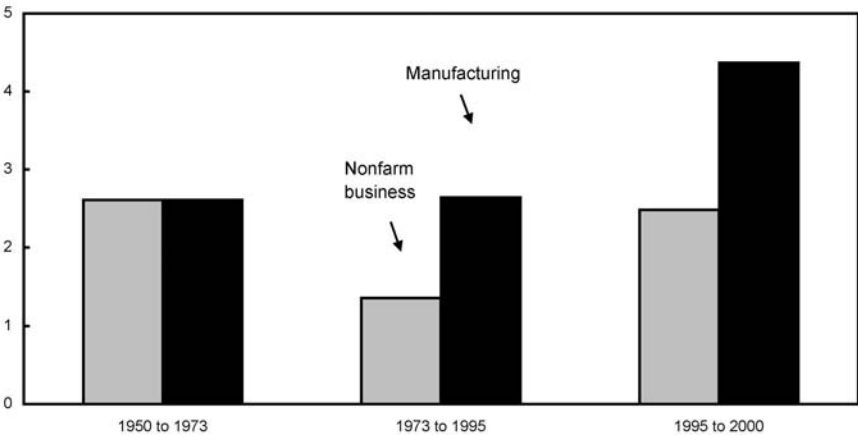
Productivity, as measured by output per hour worked, has grown more rapidly in manufacturing than in the overall nonfarm business sector over the last three decades. From 1950 to 1973, manufacturing productivity grew at about the same pace as productivity overall. Over the period from 1973 to 1995, manufacturing productivity growth exceeded productivity growth overall by about 1 percentage point per year. The disparity is even wider over the period from 1995 to 2000, when manufacturing productivity grew at an annual rate nearly 2 percentage points higher than nonfarm business productivity (Chart 2-7). An hour of work in manufacturing produced about four times as much in 2000 as it did in 1950, whereas an hour of work in the nonfarm business sector produced less than three times as much in 2000 as it did in 1950.

This dramatic productivity differential has contributed to a decline in the price of manufactured goods relative to services, which in turn helps to explain the difference between the behavior of nominal and real manufacturing output. Increased labor productivity in a sector means that fewer hours are required to make a given amount of output. This reduces the cost of production and, typically, the relative price of that output. In the same way, relative prices tend to increase in sectors that have experienced less productivity growth, such as services. For example, the falling prices of computers and other electronics have contrasted sharply with the rising costs of services. This example is confirmed by the aggregate data: the average price of consumption goods relative to services fell more than 50 percent between 1950 and 2000. In contrast to the nearly ninefold increase in the prices for

### Chart 2-7 Productivity Growth

Growth in manufacturing productivity outpaced that in nonfarm business productivity over the periods 1973 to 1995 and 1995 to 2000.

Percent, at an annual rate



Note: Nonfarm productivity based on data available as of December 3, 2003 (that is, prior to the benchmark revision of the National Income and Product Accounts). Manufacturing productivity based on revised estimates beginning 1987 (released on January 7, 2004); as revised data for earlier years are not yet available, growth rates are assumed to be the same as the previously-published SIC-based estimates.

Sources: Department of Labor (Bureau of Labor Statistics) and Council of Economic Advisers.

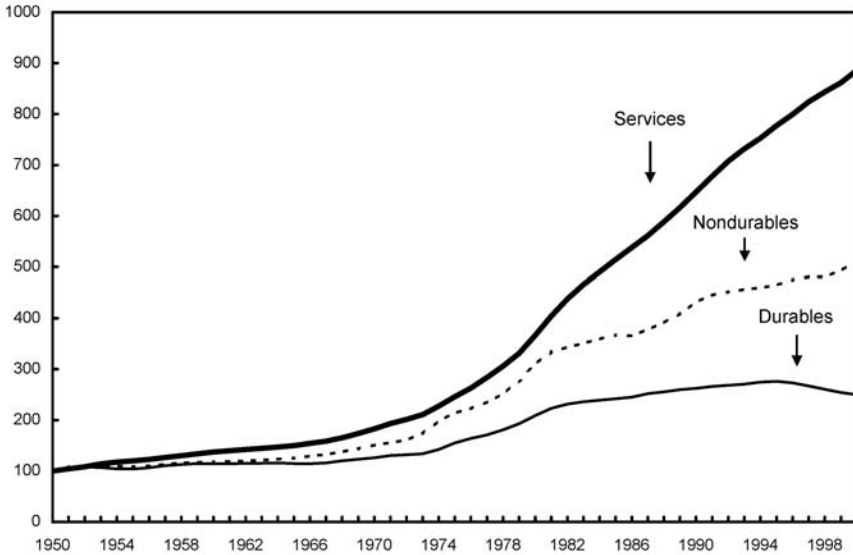
services, prices for *durable goods* (goods such as cars and refrigerators that are expected to last, on average, three years or more) rose by a factor of only 2½ and prices for *nondurable goods* rose by a factor of about 5 from 1950 to 2000 (Chart 2-8). Expressed another way, to equal the buying power of \$100 worth of durable goods in 1950, a consumer would have spent \$250 in 2000, while for \$100 worth of services in 1950, a consumer would have spent \$890 in 2000.

The slower growth of manufactured goods prices has increased the purchasing power of incomes relative to what it otherwise would have been, but the portion of this increase that Americans have allocated to manufactured goods has not been large enough to maintain manufacturing's share of nominal output. The boost to real income from the relative price decline of manufactured goods has supported demand not only for these goods but also for services such as health care and financial advice. That is, Americans have used the resources made available from the relatively slow growth in manufacturing prices to buy many things, not just manufactured goods. Increased demand for services, combined with rising relative prices for services, is reflected in the fact that health services and business services each

Chart 2-8 Price Level by Category of Personal Consumption Expenditures

Goods prices rose much less than services prices from 1950 to 2000.

Index, 1950=100



Source: Department of Commerce (Bureau of Economic Analysis).

have increased their share of total nominal output about 4 percentage points since 1950. The finance, insurance, and real estate industry has increased its share a dramatic  $9\frac{1}{2}$  percentage points. The opposite trend has held for manufacturing, in which relative price declines have not been fully offset by increases in demand. This explains why the share of manufacturing in total nominal output has roughly halved since 1950. (All calculations of industry share of nominal GDP are based on the pre-benchmark data available when this *Report* went to press.)

In other words, U.S. demand for manufacturing products has been relatively *price inelastic*. That is, demand has not been very responsive to price declines. For example, a family that purchased a car may have reacted to lower relative car prices (and the increased real income they create) by paying for college or hiring a home health care aide, rather than by putting those gains toward the purchase of another car. As a numerical example of inelastic demand, suppose that people buy 10 compact discs at \$20 each (for a total expenditure of \$200). Now suppose the price falls from \$20 to \$10. If people buy twice as many compact discs at \$10, the value of overall sales will still be \$200 (20 compact discs at \$10 each). But if people increase their purchases to 15 compact discs, the value of overall sales will be only \$150, a decline of 25 percent. This is similar to what has happened in manufacturing.

Productivity gains have tempered price increases, and demand has not responded strongly enough to keep nominal revenues constant as a share of nominal GDP.

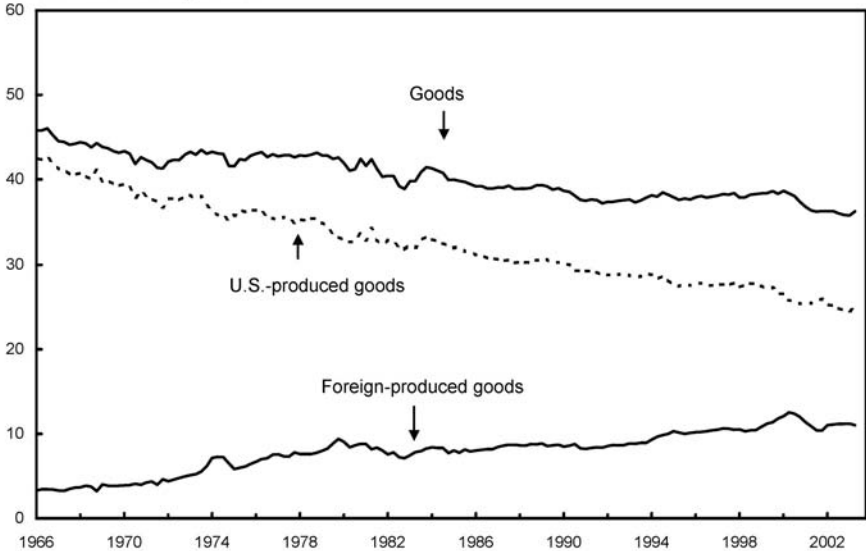
A second factor that has led to a decline in manufacturing's share of GDP is that Americans are purchasing more goods from abroad. Goods purchases as a share of total domestic purchases have been declining for about 30 years. The share of domestically produced goods has fallen somewhat faster, particularly in the 1970s and 1990s. Domestically produced goods were 91 percent of overall domestic goods purchases in 1970; by 2000, they had fallen to 68 percent. In other words, imports have made up an increased share of goods bought in the United States (Chart 2-9).

Growth in exports of manufactured goods from the United States over the past several decades has offset only some of the growth in imports (Chart 2-10). As a result, net imports of nonagricultural goods (imports minus exports) have risen materially, reaching about 30 percent of manufacturing production in 2000 (based on the pre-benchmark data available when this *Report* went to press) (Chart 2-11). In relation to the overall economy, net nonagricultural goods imports have also risen, but remained below 5 percent of GDP in 2000. China has been a growing source of manufacturing imports, although this growth has not been a major factor in the increase of the U.S. trade deficit (Box 2-1).

**Chart 2-9 U.S. Imports and Domestic Production of Goods**

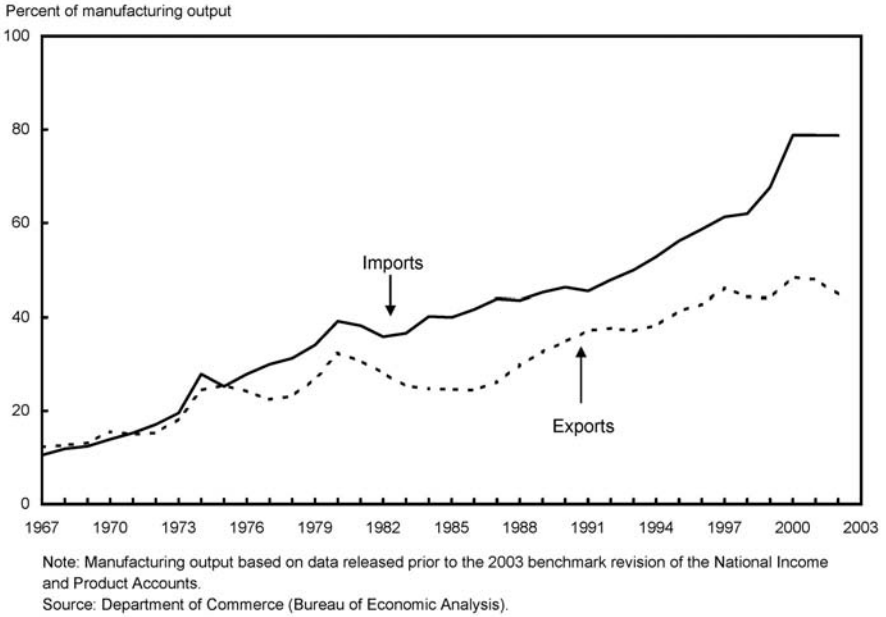
Goods produced in the United States have made up a declining share of all goods purchases in the United States since the 1960s.

Percent of total domestic purchases

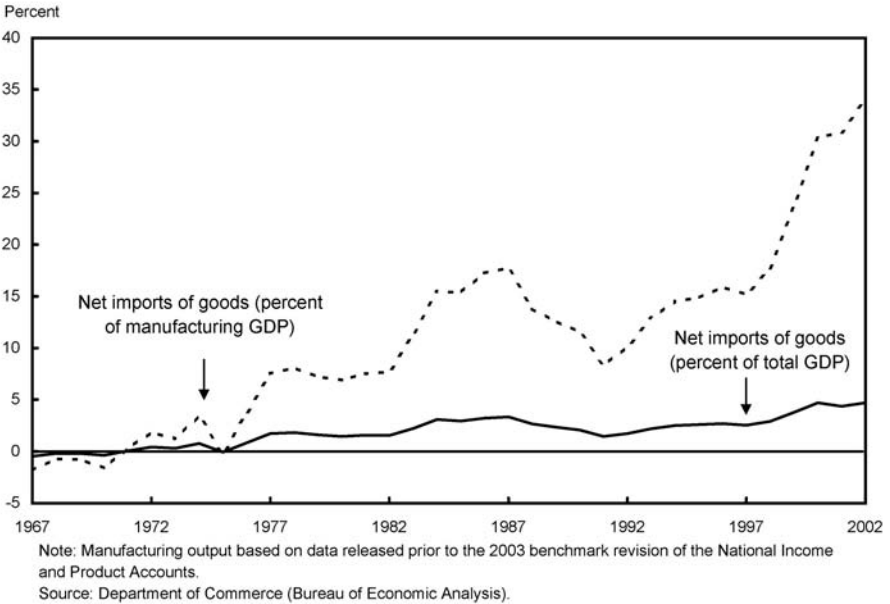


Source: Department of Commerce (Bureau of Economic Analysis).

**Chart 2-10 Nonagricultural Goods Trade as a Percent of Manufacturing Output**  
Imports and exports have increased relative to manufacturing output.



**Chart 2-11 Nonagricultural Goods Net Imports as a Percent of Output**  
Net imports of goods have risen as a percent of manufacturing GDP over the last 30 years but remain small as a share of overall GDP.



## **Box 2-1: China and the U.S. Manufacturing Sector**

The recent decline in employment in U.S. manufacturing has coincided with a sizable increase in the overall U.S. trade deficit and a sharp increase in the U.S. bilateral trade deficit with China. In part because of the high visibility of Chinese imports, which are primarily everyday consumer goods, these events have raised concerns that imports of Chinese goods come at the expense of American manufacturing workers.

### *China's Trade with the World*

While China's exports and imports grew quickly starting in the early 1990s, China's trade with the rest of the world has been modest until very recently (Chart 2-12). The growth in China's trade has been well balanced in that increased exports to the world have been matched by rising imports from the world. According to data from China's official statistical agency, China has had a trade deficit with the world excluding the United States for several years. China recently ran trade deficits with a number of other countries, including industrial countries such as Germany and Japan.

### *China's Trade with the United States*

China has a significant trade surplus with the United States, its most important export market and the destination of one-quarter of all Chinese goods exports. The U.S. trade deficit with China—about \$124 billion through November 2003 at an annual rate—is the single largest bilateral goods and services trade deficit for the United States. The next-largest bilateral deficit is with Japan, at \$66 billion through November 2003 at an annual rate.

The U.S. trade deficit excluding China has also risen dramatically since the mid-1990s and is about 3½ times larger than the bilateral deficit with China (Chart 2-13). China's share of the overall U.S. trade deficit in goods has actually fallen since 1997—exactly the period over which trade with China grew rapidly.

Greater trade with China does not appear to have contributed to an increased overall U.S. trade imbalance, as the higher share of U.S. imports from China has been more than offset by a declining share of imports from other Asian countries. The share of U.S. imports from the Pacific Rim as a whole has fallen since the mid-1990s (Chart 2-14). Restrictions on imports from China would be expected to increase imports from other low-cost foreign producers, rather than to increase production and employment for American manufacturers. That is, any job gains from reduced Chinese imports are more likely to occur in other developing countries rather than the United States.

### **Box 2-1** — *continued*

U.S. exports to China have grown strongly in the last several years, with exports to China up more than 60 percent since 2000. As of the third quarter of 2003, China was the sixth-largest U.S. export market. Exports to China have grown even while exports to the rest of the world have stagnated (Chart 2-15).

#### *The Impact of Trade with China on U.S. Manufacturing Employment*

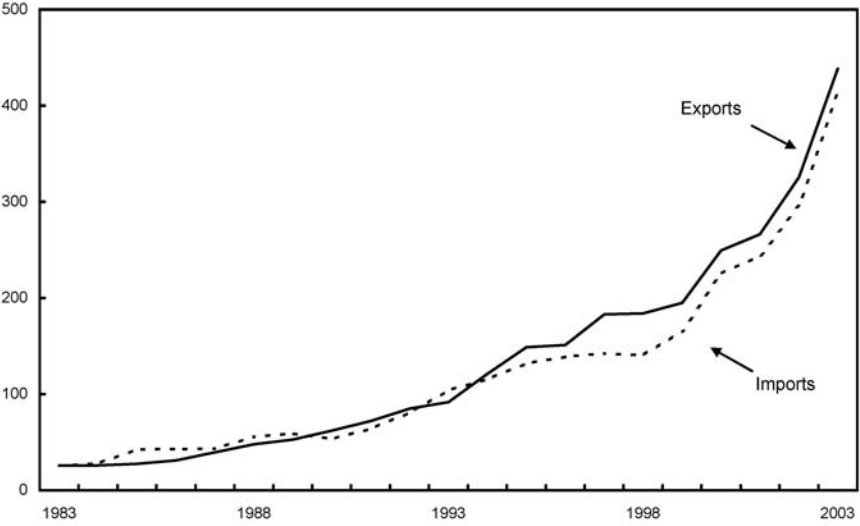
Imports from China affect the prospects for domestic firms with which they compete, and this impact often extends to workers and communities associated with these firms. This is especially the case for firms that make items that are relatively intensive in the use of less-skilled labor, as these are goods in which China has a comparative advantage in production. This may raise the question of whether imports from China are a primary factor in the displacement of American manufacturing workers.

A closer look at the data indicates this is not the case. The low level of U.S. imports from China before the mid-1990s suggests that declines in employment prior to that period were not due to U.S. trade with China. The data on more-recent job losses in manufacturing indicate that China is not a primary factor in these declines, either. With the exception of apparel, the largest job losses have occurred in export-intensive industries for the United States, and job losses in U.S. manufacturing have been mainly in industries in which imports from China are small. For example, the computer and electronic equipment industry accounts for 15 percent of all manufacturing job losses since January 2000, but imports from China were only 8 percent of U.S. output in 2002. Other export-intensive industries that have suffered large job losses include fabricated metal products (9 percent of manufacturing job losses and 2 percent of U.S. output), machinery (10 percent and 2 percent), and transportation equipment (12 percent and 0.4 percent).

**Chart 2-12 China's Trade in Goods**

The recent growth in China's trade has been divided fairly evenly between growth in imports and growth in exports.

Billions of dollars

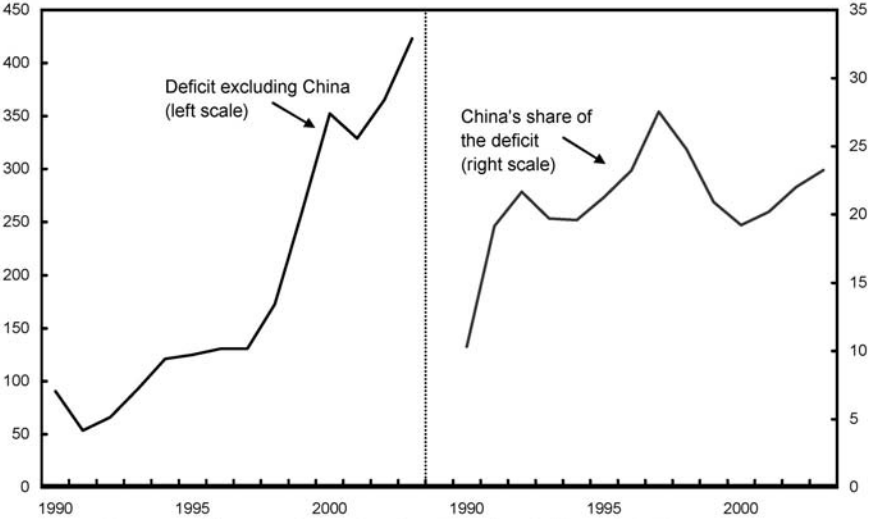


**Chart 2-13 U.S. Trade Deficit in Goods**

The U.S. trade deficit with countries other than China has risen dramatically, while China's share of the overall deficit has fallen since its peak in 1997.

Billions of dollars

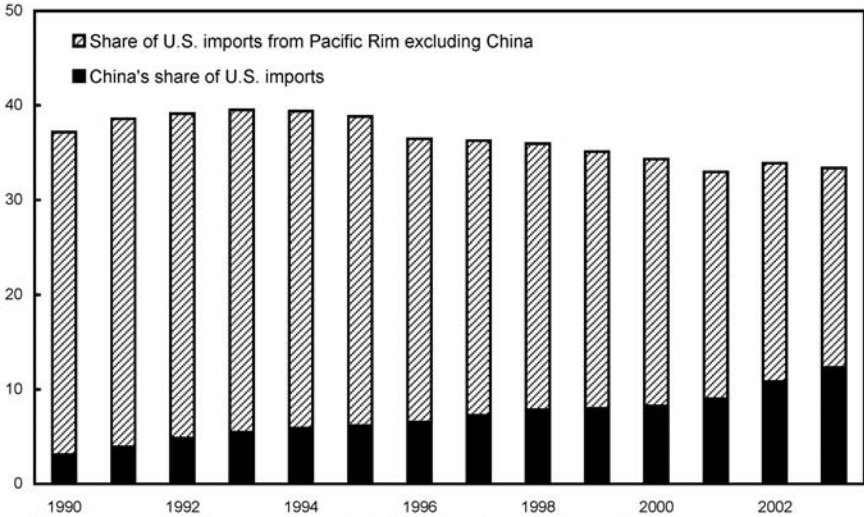
Percent



**Chart 2-14 U.S. Imports of Goods**

While the share of U.S. imports of goods from China has been increasing, the share of imports from all Pacific Rim countries combined has been falling.

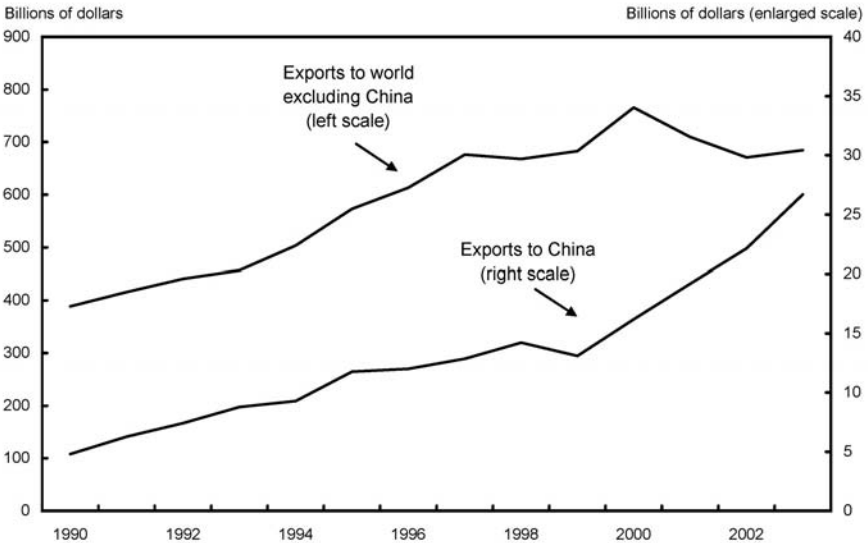
Percent of U.S. imports



Sources: Department of Commerce (Bureau of the Census) and Council of Economic Advisers.

**Chart 2-15 U.S. Exports of Goods**

Exports to China have increased dramatically over the past several years compared with lackluster growth in exports to the rest of the world.



Sources: Department of Commerce (Bureau of the Census) and Council of Economic Advisers.

# Manufacturing Employment over the Long Term

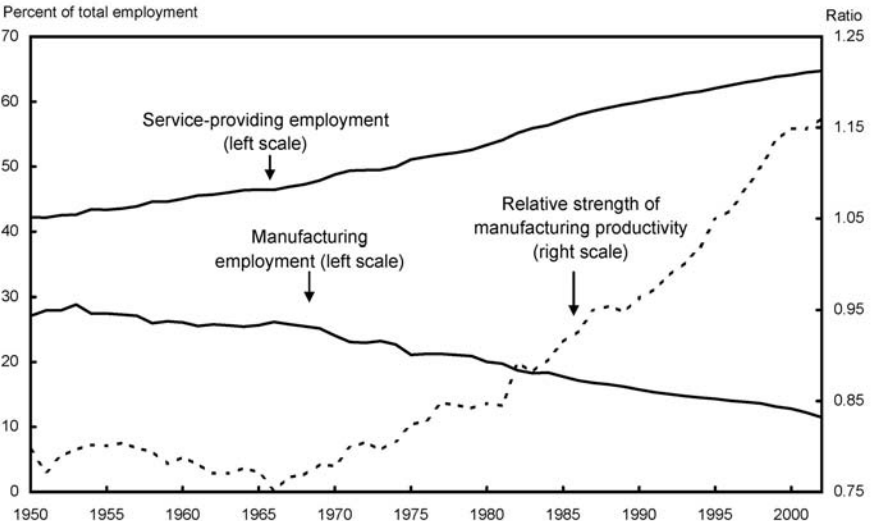
Employment in manufacturing as a share of total employment peaked in the early 1940s at about one-third of all farm and nonfarm workers. By 2000, it had declined to just below 13 percent (17 million out of 135 million employees). Employment in service-providing sectors (including transportation, wholesale and retail trade, finance, insurance, and real estate, and services) increased from 35 percent of payroll employment in the early 1940s to 65 percent (86 million workers) of all employees in 2000 (Chart 2-16).

The two main reasons for this shift from the manufacturing sector to service-providing sectors in the labor market are related to the explanations for the declining nominal share of manufacturing output. First, increased demand for services and relatively slow productivity growth in service-providing sectors have led to rising demand for workers in these sectors. In manufacturing, inelastic demand for manufactured goods and faster productivity growth have lowered the relative demand for manufacturing workers.

Second, manufacturing employment likely has fallen in response to the transfer of manufacturing jobs abroad. The jobs affected have generally been those involved in the production of goods requiring relatively low skills.

**Chart 2-16 Employment and Relative Productivity**

The decline in manufacturing's share of employment is largely due to rapid productivity gains.



Note: Ratio of manufacturing productivity to nonfarm business productivity available as of December 3, 2003 (that is, prior to the benchmark revision of the National Income and Product Accounts); both indexed to 1992=100.

Sources: Department of Labor (Bureau of Labor Statistics) and Council of Economic Advisers.

Indeed, this is part of the explanation for the rapid growth in manufacturing productivity over the last 50 years (Chart 2-16). The relatively highly-skilled American manufacturing workforce has been increasingly focused on higher-productivity activities. This shift can be seen by looking at compensation for the industries in which employment decreased or increased the most from 1950 to 2000 (Table 2-1). With a few exceptions, employment fell dramatically in industries with relatively low-skilled jobs and rose dramatically in industries with relatively highly-skilled jobs.

This specialization is a natural outcome of the opening of economies all over the world to trade. As a result of such specialization, world efficiency increases and world output goes up as countries focus on the activities in which they are relatively more productive. All countries that participate in trade benefit from this increased output.

The effect of long-term productivity improvements on the shift to service-providing jobs is far more important than increased manufacturing imports. Two simple hypothetical exercises can help to illustrate this. In the first exercise, imagine that manufacturing productivity was fixed at its value in 1970. To match the actual amount of manufacturing output in 2000, one-third of total U.S. nonfarm employment would have been required by manufacturing, compared with the 13 percent required at 2000 productivity levels. That is, without the increase in manufacturing productivity, manufacturing's share of nonfarm employment would have *increased* 8 percentage

TABLE 2-1.—*Employment in Selected Manufacturing Industries*

Industry	Change in employment, 1950 to 2000 (percent)	Compensation per employee as percent of average for all sectors, 2000
<b>Panel A</b>		
Manufacturing industries with employment that grew the fastest		
Rubber and miscellaneous plastics products	213	95
Instruments and related products	207	155
Printing and publishing	102	113
Transportation equipment other than motor vehicles and equipment	83	140
Electronic equipment	77	152
<b>Panel B</b>		
Manufacturing industries with employment that declined the fastest		
Leather and leather products	-82	78
Tobacco products	-65	195
Textile mill products	-58	77
Apparel and other textile products	-50	67
Petroleum and coal products	-42	177

Note.—Data relate to full-time equivalent employees and include some definitional changes. Not yet available are data based on the December 2003 benchmark revision of the National Income and Product Accounts.

Source: Department of Commerce (Bureau of Economic Analysis).

points rather than *decreased* 12 percentage points from 1970 to 2000. As a second exercise, imagine that trade in manufactured goods was balanced in 2000, so that net exports were zero, but assume that the share of manufacturing employment in 1970 and productivity growth from 1970 to 2000 were their actual values. This would raise the amount of manufactured goods produced in the United States. Manufacturing employment as a share of total nonfarm employment, however, would have been only 1 percentage point higher—14 percent, compared with the actual figure of 13 percent—if there had been balanced trade in manufactured goods in 2000.

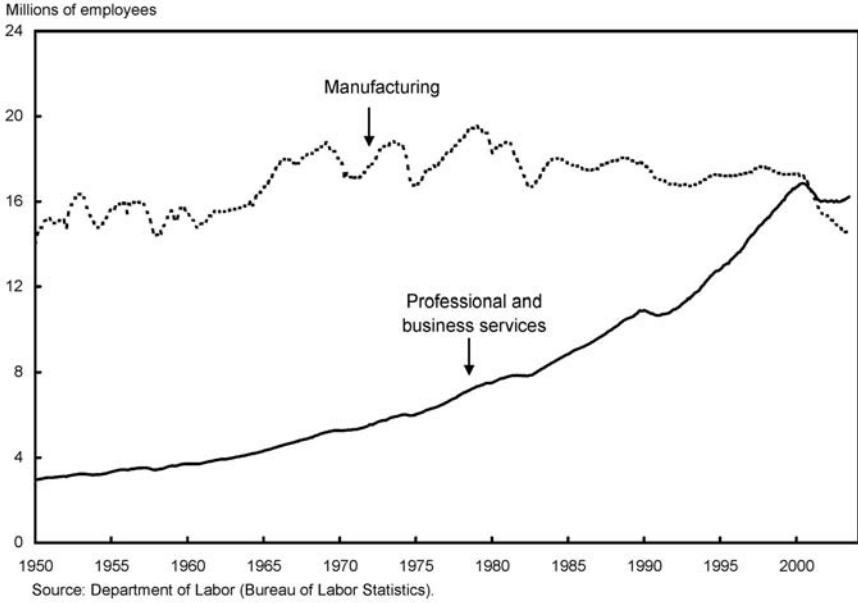
## The Effects of Domestic Outsourcing and Temporary Workers on Measurement of Manufacturing Employment

The decline in manufacturing employment in the official statistics may somewhat overstate the number of actual manufacturing production jobs that have been lost. Changing business practices in the manufacturing sector have led to both the outsourcing of nonproduction work that used to be done “in house” and the increased use of temporary workers. Manufacturing firms that once employed lawyers or accountants in their legal or finance departments might now hire outside consultants to perform these services. Counting this outsourcing as a decline in manufacturing jobs is somewhat misleading, because these workers provide services whether they are working for a manufacturing firm or an outside firm.

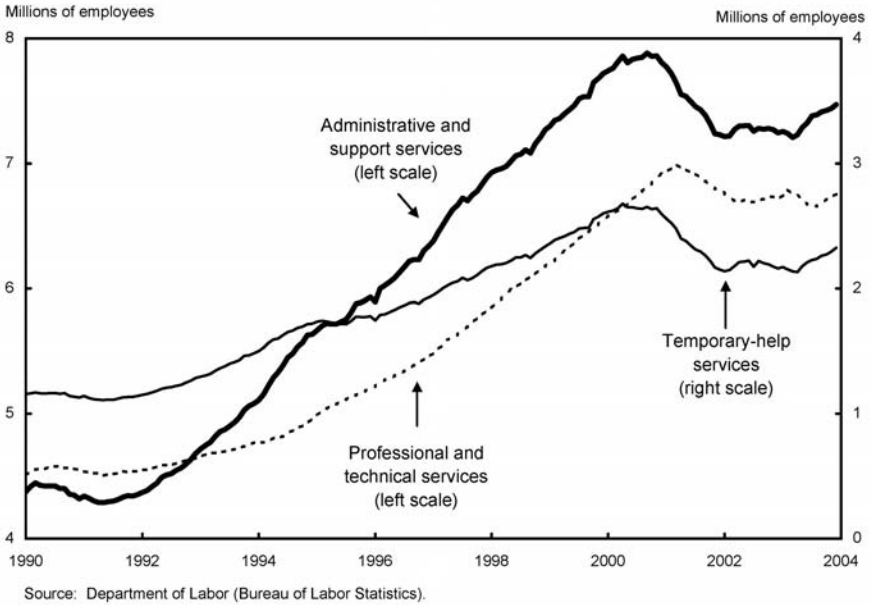
Similarly, manufacturing firms are increasingly using temporary workers, especially during periods of uncertain demand. Such workers, previously counted as manufacturing employees, are now counted as service-sector employees in the payroll employment data, although many of them still produce manufactured goods. The way in which employment statistics capture the increased use of outsourcing and temporary workers thus overstates the shift from manufacturing to service-providing jobs.

Much of the outsourced work is taken on by industries that make up the employment category “Professional and Business Services,” which includes the temporary-help services industry. The professional and business services category covers a rapidly growing sector of the labor market, so it is likely that the understatement of manufacturing employment has increased over time. Professional and business services grew from just under 3 million employees in 1950 to over 16 million employees in 2000 (Chart 2-17). Employment in subgroups of this category increased substantially in the 1990s (Chart 2-18).

**Chart 2-17 Manufacturing and Professional and Business Services Employment**  
 Employment in professional and business services has risen dramatically since 1950.



**Chart 2-18 Outsourcing and Temporary-Help Services Employment**  
 Business services employment has grown in recent years.



Results from academic studies can be used to estimate the understatement of employment in the manufacturing sector, bearing in mind that outsourced jobs are not necessarily comparable to permanent ones (for example, a temporary worker may receive fewer benefits than a permanent employee). One widely-cited study estimates that about one-third of all temporary-help services employees work in the manufacturing sector. If the official manufacturing employment statistics are adjusted by this amount, the decline in the level of manufacturing employment in the 1990s is eliminated.

In terms of shares of overall nonfarm employment, adjusted manufacturing shows a decline of 2.8 percentage points over the 1990s, compared with a drop of 3.1 percentage points in the reported data. If outsourcing were also included, the decline in the actual share of employment in the manufacturing sector would probably be even smaller. In other words, at least one-tenth (and perhaps as much as one-fourth) of the decline in manufacturing's share of employment over the 1990s does not reflect a loss of manufactured goods-producing jobs. Rather, it reflects how measurement conventions used to calculate employment statistics account for manufacturers' increased use of outsourced workers for tasks previously performed internally. Another example of how measurement conventions can affect, and confuse, the evaluation of the manufacturing sector is in the definition of manufacturing (Box 2-2).

### **Box 2-2: What Is Manufacturing?**

The value of the output of the U.S. manufacturing sector as defined in official U.S. statistics is larger than the economies of all but a handful of other countries. The definition of a manufactured product, however, is not straightforward. When a fast-food restaurant sells a hamburger, for example, is it providing a "service" or is it combining inputs to "manufacture" a product?

The official definition of manufacturing comes from the Census Bureau's North American Industry Classification System, or NAICS. NAICS classifies all business establishments in the United States into categories based on how their output is produced. One such category is "manufacturing." NAICS classifies an establishment as in the manufacturing sector if it is "engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products."

This definition is somewhat unspecific, as the Census Bureau has recognized: "The boundaries of manufacturing and other sectors... can be somewhat blurry." Some (perhaps surprising) examples of manufacturers listed by the Bureau of Labor Statistics are: bakeries, candy stores,

### **Box 2-2 — *continued***

custom tailors, milk bottling and pasteurizing, fresh fish packaging (oyster shucking, fish filleting), and tire retreading. Sometimes, seemingly subtle differences can determine whether an industry is classified as manufacturing. For example, mixing water and concentrate to produce soft drinks is classified as manufacturing. However, if that activity is performed at a snack bar, it is considered a service.

The distinction between non-manufacturing and manufacturing industries may seem somewhat arbitrary but it can play an important role in developing policy and assessing its effects. Suppose it was decided to offer tax relief to manufacturing firms. Because the manufacturing category is not well defined, firms would have an incentive to characterize themselves as in manufacturing. Administering the tax relief could be difficult, and the tax relief may not extend to the firms for which it was enacted.

For policy makers, the blurriness of the definition of manufacturing means that policy aimed at manufacturing may inadvertently distort production and have unintended and harmful results. Whenever possible, policy making should not be based upon this type of arbitrary statistical delineation.

## Effects of the Shift to Services on Workers' Compensation

Many workers affected by the structural developments in manufacturing have experienced difficult transitions. Studies indicate that displaced workers have a significant chance of being unemployed or employed in a part-time job for some time following their job loss. Many of those who are able to find new jobs suffer earnings declines compared to previous earnings. Furthermore, workers also experience losses in earnings growth relative to what they would have had if they had remained continuously employed. Because of these effects, an often-voiced concern is that the shift toward employment in services has meant that more Americans are working in low-paying jobs.

While the shift from the manufacturing sector to service-providing sectors has been painful for many displaced from the manufacturing sector, the average effect on compensation—and in particular on new entrants into the

labor force who have chosen to work in services rather than manufacturing—has been less worrisome. Some service-providing industries pay less than some manufacturing industries, but much of the employment growth in service-providing sectors has occurred in industries with higher than average compensation. The third column of Panel A in Table 2-2 shows the total compensation per full-time equivalent employee in five service-providing industries relative to the average across industries: for example, compensation in wholesale trade in 2000 was 27 percent higher than the average (which equals 100 percent). The second column gives the change in employment from 1950 to 2000 for each industry: wholesale trade employment increased more than 4 million over this period. As Panel A reveals, four of the five service-providing industries with the largest employment increases paid compensation roughly at or above the average. Together, these five service-providing industries can explain nearly two-thirds of overall private employment growth from 1950 to 2000. Panel B of Table 2-2 shows that three of the five manufacturing industries with the highest job-loss rates paid less than the average private-sector job in 2000. For example, apparel employment fell nearly 600,000 from 1950 to 2000, and compensation of workers in the apparel industry in 2000 was only 67 percent of the average. As a result of the large increases in employment in some of these high-paying service-providing industries, the gap between compensation in service-providing sectors and manufacturing has been closing over the last couple of decades.

TABLE 2-2.— *Compensation in Selected Industries*

Industry	Change in employment, 1950 to 2000 (thousands)	Compensation per employee as percent of average for all sectors, 2000
Panel A: Service-providing		
Service-providing industries with the largest employment increases		
Retail trade	14,248	57
Business services	9,079	99
Health services	8,482	103
Finance, insurance, and real estate	5,406	158
Wholesale trade	4,259	127
Panel B: Manufacturing		
Manufacturing industries with the largest employment decreases		
Textile mill products	-715	77
Apparel and other textile products	-586	67
Primary metal industries	-491	124
Leather and leather products	-321	78
Petroleum and coal products	-91	177

Note.—Data relate to full-time equivalent employees and include some definitional changes. Not yet available are data based on the December 2003 benchmark revision of the National Income and Product Accounts.

Source: Department of Commerce (Bureau of Economic Analysis).

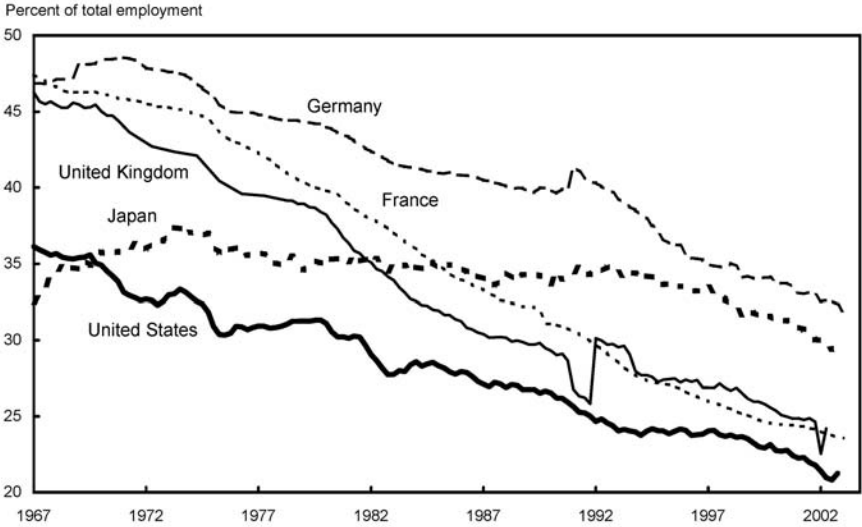
## The Transition in Context

Individuals and communities tied to declining industries experience dislocation and distress. While many workers have made the transition from manufacturing to the service sector, the transition can be difficult. To ease it, the President has supported policies for worker retraining accounts and has extended unemployment insurance benefits when needed. The appropriate policy responses to this transition will be discussed in more detail later in this chapter. Before that, however, it is useful to place the evolution of the U.S. manufacturing sector in a broader context.

First, the shift to a relatively more service-oriented economy has involved substantial benefits for American consumers and producers. Real incomes have risen, allowing consumers to purchase more goods and services such as food, health care, transportation, and education, while measures of the quality of life and life expectancy have also increased. In addition, the growth of the service-providing sector has generated new opportunities for employment in industries such as information technology services, financial services, and entertainment.

Second, the shift of employment away from lower-productivity manufacturing toward higher-productivity manufacturing and service-providing sectors reflects economic growth and development, just as the shift away from agriculture toward manufacturing did in the last century (Box 2-3). The relative shift from manufacturing toward service-providing sectors has been shared by other advanced economies over the last few decades (Chart 2-19). Manufacturing employment declined from the mid-1990s to 2002 in a number of countries whose economies are rapidly developing, including China, Brazil, and South Korea. In fact, China, Brazil, South Korea, and Japan had steeper percentage declines in manufacturing employment over that period than the United States.

**Chart 2-19 Employment in Industry as a Percent of Total Employment**  
 A declining share of employment in manufacturing is common across developed economies.



Note: Industry comprises manufacturing, mining, and construction. In 2001, manufacturing made up about two-thirds of industry in each country.  
 Source: Organization for Economic Cooperation and Development.

### **Box 2-3: The Evolution of the U.S. Agricultural Sector**

The evolution of U.S. manufacturing from 1970 to 2000 mirrors, in important respects, that of U.S. agriculture from 1940 to 1970. Total real farm output increased more than 60 percent from 1940 to 1970. Over the same period, employment in farming declined nearly 6 million, or almost two-thirds of the level in 1940 (Chart 2-20). This translated into a decline in agriculture’s share of total employment of 15 percentage points, from 19.4 percent in 1940 to 4.4 percent in 1970.

While the histories of agriculture and manufacturing in the United States differ in some ways, such as the prominent role of subsidies in the agricultural sector, their similarities help put the long-term story of the manufacturing sector in context.

In both sectors, a 30-year period of rapid productivity growth substantially reduced the share of the American workforce needed to meet demand for food and manufactured goods. Labor productivity in agriculture nearly quadrupled from 1940 to 1970 (Chart 2-21), a period that has been called the “second American agricultural revolution.”

### **Box 2-3** — *continued*

This productivity boom has been attributed to the invention of new technologies, such as hybrid crop varieties, as well as the widespread application of existing technologies, such as machinery and conservation practices.

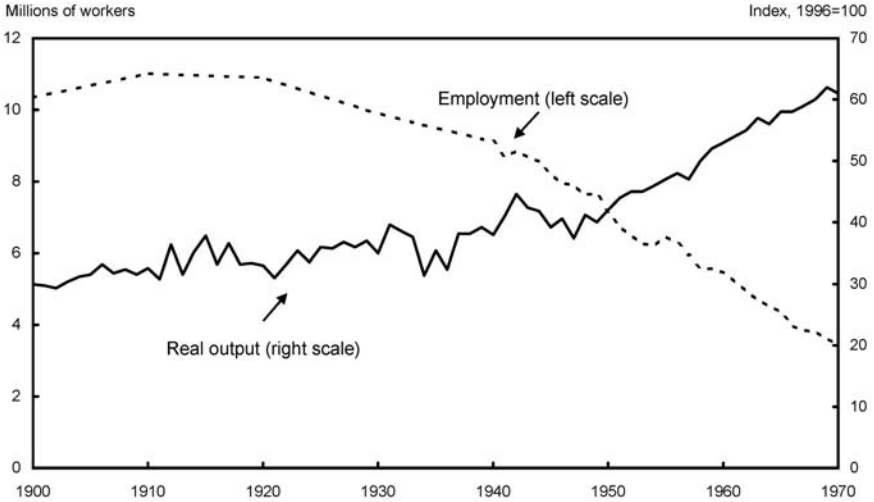
Agricultural productivity growth led to low growth in the price of food, bringing substantial benefits to American consumers and the U.S. economy as a whole and significantly improving U.S. competitiveness in world markets. Despite the mid-century expansion in the demand for agriculture's output, prices remained essentially flat. After the run-up in demand and prices during World War II and its immediate aftermath, agricultural prices increased only 4 percent from 1950 to 1970. The average price of all commodities, in comparison, increased 35 percent from 1950 to 1970 (Chart 2-22). The lack of food price inflation is mimicked by the low inflation in manufacturing in the last few decades, with a sizable benefit for American consumers in both cases.

The evolution of the agricultural sector has been good for the economy on the whole, but it meant dislocation for millions of agricultural workers—a process that continues today. Displaced farm workers faced uncertainty regarding their next job and the applicability of their skills in different sectors, just as manufacturing workers do today. The 1940s and 1950s saw the rapid growth of new industries that hired workers no longer needed on farms. Manufacturing itself likely absorbed a substantial percentage of former agricultural workers: nearly 8 million new manufacturing jobs were created between 1940 and 1970, 2 million more than the total decline in agricultural employment.

In the 1970s and 1980s, service-providing sectors likely absorbed workers not needed in manufacturing. This continued in the 1990s, as high-tech and financial services accounted for new employment growth. Looking forward, it is difficult to predict which industries will grow and require more workers. The past experience of the adjustment in agriculture suggests that market forces will continue to reshape the American workforce.

**Chart 2-20 Employment and Real Output in Agriculture**

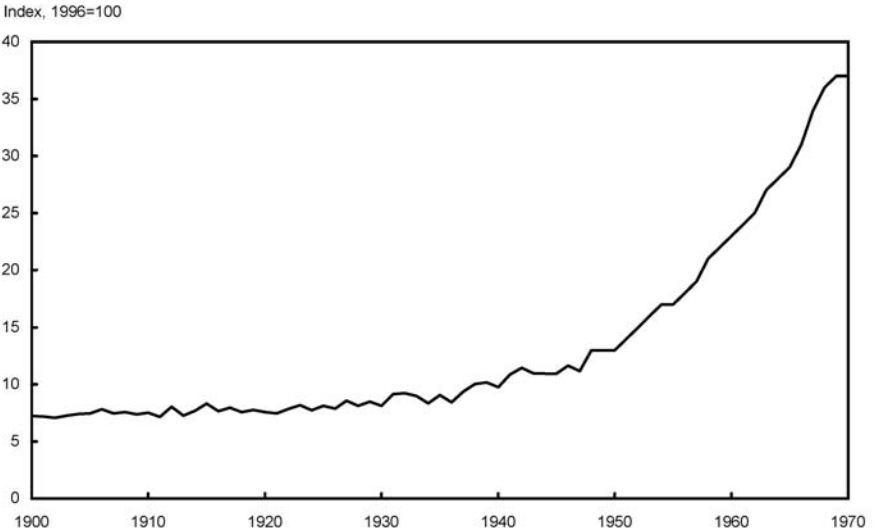
Agricultural employment declined dramatically from 1940 to 1970, while real agricultural output increased substantially.



Sources: Department of Commerce (Bureau of the Census and Bureau of Economic Analysis) and Council of Economic Advisers.

**Chart 2-21 Agricultural Productivity**

Agricultural productivity on farms surged in the mid-20th century

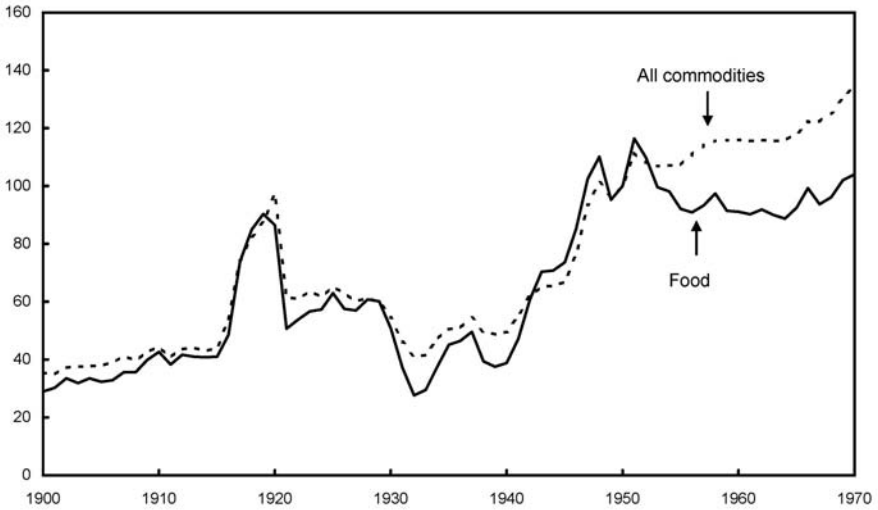


Sources: Department of Commerce (Bureau of the Census) and Council of Economic Advisers.

Chart 2-22 **Wholesale Prices**

The price of food relative to all commodities declined substantially in the mid-20th century.

Index, 1950=100



Source: Department of Labor (Bureau of Labor Statistics).

## The Role of Policy

Markets operating free from government intervention will, in most cases, best allocate the Nation's resources across sectors. It is generally a mistake to target government assistance to a particular sector at the expense of other sectors, and manufacturing is no exception. That said, government policy can play a positive role. Policies targeted toward general education and training, such as the President's landmark education reforms and proposed funding to help displaced workers train for new opportunities, will help people adapt to ongoing structural changes. The President's Jobs for the 21st Century plan will support students and workers by improving high school education and strengthening post-secondary education and job training.

The short-run performance of the manufacturing sector is closely tied to fluctuations in overall economic activity. Policies that increase aggregate output and economic growth will help to improve the near-term outlook for the manufacturing sector. This Administration put forward a six-point plan for the U.S. economy in September 2003. The plan would help the manufacturing sector along with the overall economy, and it includes the following components:

### *Making Tax Relief Permanent*

The Administration has undertaken several important fiscal measures to strengthen growth, including the 2001 tax relief program, the March 2002 stimulus package, and the May 2003 Jobs and Growth Act. These policies have already contributed to the current recovery in manufacturing. The President has proposed making provisions of the 2001 and 2003 tax cuts permanent. These include measures that lower the cost of capital and thereby encourage business investment. Capital investment makes up a relatively large share of manufacturers' costs, so a lower cost of capital provides a particularly important benefit to manufacturers. Moreover, manufacturers produce capital goods, so increased investment demand particularly benefits manufacturing firms.

### *Making Health Care Costs More Affordable and Predictable*

The President's proposals aim to reduce frivolous litigation, help individuals save for future health expenses, and allow small businesses to pool together to purchase health coverage. Health care costs as a share of total compensation are one-third higher in manufacturing than in service-providing industries. The President's proposals will help manufacturers reduce the burden of increasing health care costs.

### *Reducing the Burden of Lawsuits on the Economy*

The President seeks to address the burden that lawsuits impose on American businesses. For example, estimates suggest that roughly 60 companies entangled in asbestos litigation have gone bankrupt primarily because of asbestos liabilities, displacing between 52,000 and 60,000 workers.

### *Ensuring an Affordable, Reliable Energy Supply*

Initiatives include modernizing the electricity grid and streamlining the process of acquiring permits for natural gas exploration. This is vital for manufacturing, which makes up about 15 percent of nominal GDP but accounts for around one-quarter of energy use in the United States.

### *Streamlining Regulations to Ensure that they are Reasonable and Affordable*

Research has shown that manufacturing bore about 30 percent of the costs of regulation in the United States in 2000—nearly double its share of nominal output.

### *Opening International Markets to American Goods and Services*

This has become particularly important for the manufacturing sector. While exports accounted for about one-sixth of American manufacturing production in 1970, they made up nearly half by 2002.

## Conclusion

The manufacturing sector in the United States has undergone significant change in the last half-century. Productivity and real output in manufacturing have risen dramatically, and faster than in the economy as a whole. Productivity improvements have boosted real income in the United States. However, because Americans have spent much of their real income gains on services rather than manufactured goods, manufacturing's share of employment has declined. In the recent recession, manufacturing output and employment were hit particularly hard. The President's policies, aimed at stimulating the overall economy, easing restrictions that impede manufacturing growth, and ensuring that workers have the skills they need to be competitive, address the short-term difficulties of the sector and ensure its long-term health.