

Productivity and labor costs trends in manufacturing, 12 countries

Output and output per hour in manufacturing rose in the United States and 11 other countries in 1984; U.S. unit labor costs increased 7 percent, relative to the costs of foreign competitors, after adjustment for the dollar's appreciation

EDWIN DEAN, HARRY BOISSEVAIN,
AND JAMES THOMAS

Manufacturing productivity, as measured by output per hour, rose in 1984 in the United States and 11 other industrial countries studied. The United States had a substantial increase of 5 percent, but this was exceeded by five of the other countries—Japan, France, Italy, the Netherlands, and Sweden. Belgium, West Germany,¹ and the United Kingdom about matched the U.S. gain; Canada, Denmark, and Norway had smaller increases.

Manufacturing output grew in all 12 countries in 1984, for the first time since 1973. The U.S. and Japanese output growth rates of more than 11 percent were the largest, and the French increase of 2 percent was the lowest. Productivity rose in the United States, Canada, Japan, Denmark, Norway and Sweden because output rose at a greater rate

than hours.² The productivity increases for the other countries resulted from a combination of output gains coupled with decreased hours.

Unit labor costs, which reflect changes in productivity and hourly compensation, fell in the United States, Canada, Japan, Germany, and the Netherlands; and rose in the other European countries. However, unit labor costs measured in U.S. dollars were again significantly influenced by changes in currency exchange rates, as they have been since 1980. The dollar remained stable with the Japanese yen, but appreciated 5 percent against the Canadian dollar and 7 to 14 percent against the European currencies. Consequently, unit labor costs fell in each of the 11 foreign countries when measured in U.S. dollars, with the falloffs ranging from 3 to 15 percent—compared with a 1-percent decline in the United States.

Since 1980, U.S. manufacturing unit labor costs have risen at a 7-percent average annual rate relative to a trade-weighted average for the 11 rival industrial countries, re-

Edwin Dean, formerly an economist in the Division of Foreign Labor Statistics, Bureau of Labor Statistics, is now chief of the Bureau's Division of Productivity Research. Harry Boissevain and James Thomas are economists in the Division of Foreign Labor Statistics.

versing the gains in comparative unit labor costs that U.S. manufacturers experienced during most of the 1970's. All of the 1980–84 relative increase, however, resulted from the appreciation of the U.S. dollar. Measured on a national currency basis, U.S. unit labor costs decreased at a 1-percent average annual rate relative to the trade-weighted average for the other 11 countries. Along with the rapid rise in U.S. relative unit labor costs in this period, the U.S. merchandise trade deficit increased fourfold.

This article examines 1984 developments in manufacturing labor productivity, hourly compensation, and unit labor costs in the United States and 11 countries, and compares unit labor cost trends measured in U.S. dollars prior to 1980 with the trends of the last 4 years. The indexes for 1984 are preliminary, while those for other recent years reflect some revised underlying statistics for most countries.³

The U.S. figures reflect the recent comprehensive benchmark revision of the U.S. national accounts, including the shift in the base period for the calculation of constant dollar estimates from 1972 to 1982. The effect is to reduce U.S. manufacturing output growth, and productivity, by about two-tenths of a percentage point in the pre-1973 period, but to have virtually no overall effect on the post-1973 period. Japan also rebenchmarked its national accounts, from 1975 to 1980, resulting in about a 1.5-percentage point reduction in output and productivity growth rates since 1973. In addition, a new average hours series has been introduced for Germany,⁴ as well as new output series for the Netherlands⁵ and the United Kingdom⁶ since the previous *Monthly Labor Review* article in 1984.⁷ The new series for Germany affects the year-to-year movements in output per hour and hourly compensation, but has no effect on the unit labor cost measures.

Productivity trends

As noted earlier, 1984 manufacturing productivity⁸ increased for all the countries studied. (See table 1.) The Netherlands had the largest gain—more than 10 percent—followed by Japan, France, Italy, and Sweden, with gains of about 6 to 7 percent. Output per hour rose about 5 percent

in the United States, Belgium, Germany, and the United Kingdom, and 1 to 4 percent in Canada, Denmark, and Norway.

Productivity researchers have found that a marked slowdown in manufacturing productivity growth occurred in most developed countries beginning about 1973. All 12 countries studied here had slower productivity gains in the 1973–84 period than in the 1960–73 period.

Another study reports that this slowdown in total manufacturing productivity was reflected in specific manufacturing industries in the United States, France, Germany, and the United Kingdom—after 1973, productivity growth declined in each of 13 manufacturing industry groups, in these four countries, with only one exception.⁹

For all but three of the 12 countries—Belgium, Denmark, and Norway—the 1984 increases in total manufacturing productivity were much larger than the average trend for the 1973–84 period. Moreover, the United States, the Netherlands, and the United Kingdom had 1984 gains that exceeded their average rates of increase over the 1960–73 period.

Output. In all 12 countries, output gains influenced the 1984 productivity increases. (See table 2.) Output (gross product originating in manufacturing at constant prices) rose most rapidly in the three non-European countries, with growth between 8 and 12 percent. The percentage increases were the largest since 1973 for Canada and Japan, and since the 1950's for the United States.

The European countries output increases exceeded their performance of the previous year. Denmark, the Netherlands, and Sweden had strong gains of between 5 and 7 percent; Germany, Italy, and the United Kingdom grew by 4 percent; and Belgium, France, and Norway had more modest expansions of less than 3 percent. Output gains were the largest since 1976 for the Netherlands, and since 1973 or 1974 for Norway, Sweden, and the United Kingdom. Although the British output increase was larger than in recent years, the level of output was still 12 percent below that of 1973. Canada, Italy, and Norway were the only other

Table 1. Annual percent changes in manufacturing productivity, 12 countries, 1960–84

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden	Eleven foreign countries (weighted) ¹
Output per hour:													
1960–84	2.4	3.4	8.3	5.7	4.9	5.5	3.5	7.1	5.6	6.6	3.6	4.7	5.5
1960–73	2.8	4.5	10.6	6.7	5.9	6.9	4.4	7.0	6.4	7.6	4.5	6.6	6.9
1973–84	2.1	1.6	5.9	4.6	3.4	3.8	2.3	6.2	3.5	4.6	2.3	2.8	3.8
1973–80	1.7	2.0	5.9	4.9	3.9	3.5	1.2	6.4	4.5	5.2	2.0	2.2	3.9
1981	2.2	2.0	3.7	3.9	2.1	3.5	6.2	6.9	1.6	2.7	.4	.4	3.4
1982	2.2	-2.8	6.1	6.1	1.6	2.0	4.5	4.7	-7	2.4	2.7	3.0	2.8
1983	6.6	6.4	5.4	4.2	6.1	2.4	7.3	6.8	3.5	5.3	5.6	7.7	5.7
1984	4.9	3.7	7.0	5.7	4.6	6.6	4.7	4.6	.8	10.5	2.0	5.7	5.5

¹A trade-weighted average of the 11 foreign countries. See description of weights in text.

NOTE: Rates of change computed from the least squares trend of the logarithms of the index numbers. Index numbers for the underlying data series are available from the authors.

Table 2. Annual percent changes in manufacturing output, 12 countries, 1960–84

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Output:												
1960–84	3.0	4.1	8.9	5.0	3.3	4.8	1.1	4.5	3.7	4.0	2.7	2.8
1960–73	4.4	6.3	12.9	7.3	5.2	6.8	3.0	6.5	5.2	6.4	4.8	5.0
1973–84	1.8	1.1	5.9	2.0	1.2	2.3	-1.5	1.6	2.1	1.2	-1	.3
1973–80	2.5	2.3	4.7	3.0	2.0	3.4	-1.1	1.6	2.2	1.6	-2	-2
1981	1.6	1.0	4.5	-7	-1.5	-9	-6.0	-1.2	-3.2	.1	-1.1	-3.3
1982	-6.1	-11.4	5.8	.1	-2.4	-2.4	.2	3.0	1.6	-1.5	-2	-5
1983	7.3	5.5	8.0	1.3	1.0	-2.4	2.9	1.5	3.6	.3	-1.2	5.1
1984	11.7	8.2	11.4	2.1	3.9	3.8	3.9	1.8	5.7	5.2	2.5	6.8

NOTE: Rates of change computed from the least squares trend of the logarithms of the index numbers. Index numbers for the underlying data series are available from the authors.

countries in which manufacturing output had not yet recovered to previous peak levels.

Employment and hours

In the three non-European countries and Denmark, total hours of input in manufacturing rose between 4 and 7 percent in 1984, with the United States recording the largest gain. (See table 3.) Total hours rose modestly in Norway and Sweden and fell in the remaining 6 countries; except for France, the declines in total hours were smaller than in the previous year.

All of the European countries have experienced long-term declines in aggregate hours over the 1973–84 period, ranging from an annual average rate of about 1.5 percent in Denmark and Italy to around 4 percent in Belgium and the United Kingdom. In Japan, Canada, and the United States, there has been little overall change in total hours over the 1973–84 period.

The 1984 expansions in aggregate hours in the United States and Japan were the result of substantial increases in employment and small percentage increases in average hours. In Canada, a large increase in employment was accompanied by a slight drop in average hours. The 1984 employment increases in the United States, Canada, and Japan were the largest since 1973. Nonetheless, the levels of manufacturing employment in the United States and Canada in 1984 were between 5 and 8 percent below the peaks of the late 1970's, while in Japan, 1984 was about 1 percent below the previous peak reached in 1974.

Among the European countries, Belgium, Germany, the Netherlands, the United Kingdom, and the three Scandinavian countries all recorded either a rise or a lower rate of decrease in 1984 employment, compared with 1983. These countries also had higher rates of employment growth or smaller rates of decline in 1984 than they experienced, on average, during the 1973–84 period. In contrast, employment in France and Italy declined at a more rapid rate in 1984 than the average for the 1973–84 period.

The long-term trend in manufacturing employment has been downward in the European countries. Most countries had employment peaks in the 1960's or 1970's that were

more than 15 percent above 1984 levels. The contrast, in this respect, to the three non-European countries is marked, and essentially unaltered by the favorable employment developments in 1984 in seven of the nine European countries.

In most of the European countries, the 1984 changes in aggregate hours took place mainly as a result of changes in employment rather than in average hours per employee. Changes in average hours had substantial effects on aggregate hours only in Belgium and the Netherlands, where average hours declined by 2 to 3 percent.

The declines in Belgium and the Netherlands occurred as employers, unions, and government took measures, beginning in 1982 and continuing through 1984, to reduce average hours worked, hoping that this would retard the rapid rate of decline in employment. A key element in these efforts has been a reduction in average hours through reorganization of work time negotiated at the company, industry, and sectoral levels. The negotiations in both countries produced a variety of reorganization schemes, but the most common provided for reduced annual hours by granting additional days of vacation or free shifts. The Netherlands Central Bureau of Statistics reported that by the end of 1984, hours reductions had affected 63 percent of firms and 86 percent of employees in Dutch manufacturing. In both countries—despite the concerted efforts of government and collective bargaining agents—employment continued to fall in 1984, but the rate of decline was substantially less than in the preceding 2 years.¹⁰

Over the 1973–84 period, average hours per employee declined in nine of the countries studied. In the remaining three countries—the United States, Japan, and Denmark—average hours were essentially unchanged. Only two countries, Belgium and the Netherlands, had 1984 reductions in average hours that exceeded the long-term trend.

Hourly compensation

For all countries, hourly compensation costs—which include wages and salaries, supplements, and employer payments for social security and other employee benefit programs—rose at a lower rate in 1984 than the average for the years since 1973. (See table 4.) Canada had the lowest rise,

less than 2 percent, followed by Japan, the United States, and Germany, each with less than 4 percent increases. Belgium, Denmark, France, the Netherlands, Norway, and the United Kingdom recorded increases of 5 to 9 percent. Italy and Sweden had the highest rates, about 10 to 11 percent.

The Netherlands and Sweden were the only countries to show a markedly more rapid rise in hourly compensation in 1984 than in 1983. For Sweden, 1984 was the second consecutive year of progressively larger increases. In Denmark, the 1984 compensation increase was the lowest since the 1950's, which may be attributed, in part, to the fact that in late 1982 the government imposed a 2-year freeze on pay indexation and restricted local-level collective bargaining.¹¹

Unit labor costs

Productivity increases in 1984 more than offset the rises in hourly compensation costs in the United States, Canada, Japan, Germany, and the Netherlands; consequently, unit labor costs fell 1 to 4 percent. This marked the third consecutive year in which unit labor costs fell in Japan and the second consecutive year of declines for the United States, Germany, and the Netherlands. Unit labor costs rose between 2 and 5 percent in the other countries. Italy had one of the largest increases (4 percent), but this represented a sharp deceleration from Italy's 1983 increase (14 percent).

As noted earlier, the 1984 increases in hourly compensation were below the 1973–84 trend rates in all 12 countries, and the 1984 increases in output per hour were well above

the 1973–84 trend in 9 countries. Therefore, it is not surprising that the 1984 performance in unit labor costs was favorable, compared to 1973–84 trends, because unit labor costs represent the ratio of hourly compensation to output per hour.

In U.S. dollars. Because labor costs are a principal component of the costs of manufactured goods, unit labor costs play a major role in conjunction with the exchange rates among currencies in determining the relative prices of goods offered for sale on the world market.

During 1984, changes in currency exchange rates had a significant effect on relative changes in unit labor costs measured in U.S. dollars. The U.S. dollar appreciated relative to the currencies of 10 of the countries studied and remained unchanged relative to the Japanese yen. In each year of the 1980–84 period, the dollar appreciated strongly relative to each of the European countries' currencies. It appreciated much more moderately relative to the Canadian dollar in 3 of the years. The dollar rose relative to the yen only in 1982. However, as of 1984, the yen had not regained its 1980 currency exchange value.

In 1984, unit labor costs measured in U.S. dollars fell in the 11 foreign countries. The decreases were 15 percent for the Netherlands; 10 to 11 percent for Belgium, France, Germany, Italy, and the United Kingdom; 6 to 8 percent for Canada, Denmark, and Norway; and less than 4 percent for Japan and Sweden. The 1984 changes were more damaging

Table 3. Annual percent changes in manufacturing employment and hours, 12 countries, 1960–84

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Aggregate hours:												
1960–84	0.6	0.7	0.5	-0.6	-1.5	-0.6	-2.4	-2.5	-1.8	-2.4	-0.8	-1.8
1960–73	1.6	1.7	2.1	.6	-.6	-.1	-1.3	-.5	-1.1	-1.1	.2	-1.5
1973–84	-2	-.5	.0	-2.5	-2.1	-1.4	-3.8	-4.4	-1.3	-3.2	-2.3	-2.5
1973–80												
1981	.7	.3	-1.1	-1.8	-1.9	-.1	-2.3	-4.5	-2.2	-3.4	-2.1	-2.4
1982	-.6	-1.0	.8	-4.4	-3.6	-4.3	-11.5	-7.6	-4.7	-2.6	-1.5	-3.7
1983	-8.1	-8.8	-.3	-5.6	-4.0	-4.3	-4.1	-1.6	2.4	-3.9	-2.9	-3.4
1984	.6	-.8	2.5	-2.8	-4.8	-4.7	-4.1	-4.9	.0	-4.8	-6.4	-2.3
1984	6.5	4.4	4.1	-3.4	-.7	-2.7	-.7	-2.6	4.8	-4.7	.5	1.1
Employment:												
1960–84	.6	1.0	1.2	.2	-.6	.7	-1.6	-1.2	-.7	-1.4	.3	-.5
1960–73	1.5	1.9	3.0	1.1	.3	1.4	-.6	.5	.2	.0	1.2	-.2
1973–84	-.1	-.2	-.2	-1.5	-1.5	-.7	-3.3	-3.5	-1.2	-2.7	-1.3	-1.5
1973–80												
1981	.8	.6	-1.2	-1.1	-1.2	.1	-1.7	-3.6	-1.7	-2.4	-.4	-.9
1982	-.5	-.2	1.4	-3.3	-2.4	-1.9	-10.4	-5.4	-3.5	-3.2	-1.4	-3.1
1983	-6.7	-7.8	-.1	-1.4	-3.7	-2.2	-5.2	-3.8	-.2	-4.5	-2.8	-4.1
1984	-1.7	-1.8	1.9	-2.2	-4.1	-3.2	-5.0	-2.7	-.2	-4.8	-6.4	-2.6
1984	5.1	4.4	2.9	-3.0	-1.0	-4.0	-1.6	-.9	5.1	-2.0	-.6	.2
Average hours:												
1960–84	-.1	-.3	-.7	-.8	-.9	-1.4	-.7	-1.3	-1.1	-1.1	-1.1	-1.3
1960–73	.1	-.2	-.9	-.5	-.9	-1.5	-.7	-1.0	-1.4	-1.1	-1.0	-1.3
1973–84	-.1	-.4	.2	-1.0	-.7	-.6	-.4	-.8	-.2	-.5	-1.0	-1.0
1973–80												
1981	-.1	-.3	.1	-.8	-.7	-.2	-.6	-.9	-.6	-1.0	-1.7	-1.5
1982	.0	-1.1	-.6	-1.2	-1.2	-2.4	-1.2	-2.3	-1.2	.6	-.1	-.6
1983	-1.5	-1.1	-.2	-4.3	-.3	-2.1	1.2	2.3	2.6	.6	-.1	.7
1984	2.4	1.0	.6	-.6	-.8	-1.5	.9	-2.3	.2	0.0	.0	.3
1984	1.3	-.1	1.2	-.5	.3	1.4	.9	-1.7	-.3	-2.8	1.1	.9

NOTE: Rates of change computed from the least squares trend of the logarithms of the index numbers. Index numbers for the underlying data series are available from the authors.

Table 4. Annual percent changes in hourly compensation and unit labor costs in manufacturing, 12 countries, 1960-84

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden	Eleven foreign countries (weighted) ¹
Hourly compensation:													
1960-84	7.2	9.2	13.6	12.7	9.7	16.8	13.6	12.3	12.8	12.0	11.6	11.8	12.1
1960-73	5.0	6.4	14.5	9.5	9.8	12.3	8.6	10.7	11.8	12.6	9.8	10.3	10.5
1973-84	8.9	11.0	8.2	14.9	7.7	19.3	16.0	10.7	11.0	8.2	11.3	11.5	11.1
1973-80	9.5	11.7	10.7	15.7	8.9	19.9	19.4	12.9	12.9	10.4	12.8	13.5	12.8
1981	9.6	16.0	7.6	15.4	7.0	23.1	13.5	11.1	10.1	4.5	11.6	10.9	11.6
1982	8.5	10.3	5.2	17.9	5.0	20.4	9.3	5.0	7.7	6.9	9.3	7.3	8.8
1983	3.6	7.3	3.0	12.1	5.7	16.7	7.5	8.1	8.2	4.9	11.1	9.1	6.8
1984	3.7	1.4	2.9	8.4	3.7	10.8	7.2	6.4	5.5	5.6	7.0	10.1	4.6
Unit labor costs:													
1960-84	4.7	5.6	4.9	6.7	4.6	10.7	9.8	4.8	6.8	5.0	7.7	6.8	6.2
1960-73	2.2	1.8	3.6	2.6	3.7	5.1	4.1	3.4	5.1	4.7	5.1	3.5	3.3
1973-84	6.6	9.2	2.2	9.8	4.2	15.0	13.4	4.3	7.3	3.4	8.8	8.5	7.0
1973-80	7.6	9.5	4.5	10.2	4.8	15.9	17.9	6.2	8.0	5.0	10.7	11.1	8.6
1981	7.3	13.7	3.7	11.1	4.8	18.9	6.9	3.9	8.3	1.8	11.2	10.4	7.9
1982	6.2	13.5	-8	11.2	3.3	18.1	4.6	.3	8.5	4.3	6.4	4.2	5.8
1983	-2.8	.8	-2.3	7.6	-4	14.0	.2	1.2	4.5	-4	5.2	1.3	1.0
1984	-1.2	-2.2	-3.9	2.6	-8	3.9	2.4	1.7	4.6	-4.4	5.0	4.1	-8
Unit labor costs in U.S. dollars:													
1960-84	4.7	4.9	7.5	5.7	8.1	7.0	7.0	6.1	6.6	7.3	8.8	6.4	6.7
1960-73	2.2	1.9	5.0	2.4	6.1	5.4	2.6	4.5	5.0	6.0	6.0	4.3	4.0
1973-84	6.6	6.3	4.5	4.3	4.4	4.8	9.2	1.6	2.6	2.9	5.9	2.8	5.3
1973-80	7.6	6.4	9.5	11.3	11.3	9.5	16.1	11.3	9.7	10.6	12.7	11.2	10.3
1981	7.3	10.9	6.1	-13.8	-15.6	-10.7	-6.9	-18.0	-14.5	-18.8	-4.4	-7.9	-3.3
1982	6.2	10.2	-12.1	-8.1	-4.1	-7	-9.7	-18.9	-7.3	-2.9	-5.4	-16.0	-5.4
1983	-2.8	1.0	2.5	-7.1	-5.3	1.6	-13.1	-9.3	-4.7	6.8	-7.0	-17.0	-3.3
1984	-1.2	-7.0	-3.8	-10.5	-11.0	-10.1	-9.7	-9.9	-7.6	-15.0	-6.1	-3.4	-7.9

¹A trade-weighted average of the 11 foreign countries. See description of weights in text.

NOTE: Rates of change computed from the least squares trend of the logarithms of the index numbers. Index numbers for the underlying data series are available from the authors.

to the competitive position of the United States than the shifts of the previous year. In 1983, when U.S. unit labor costs decreased by about 3 percent, they decreased by larger proportions in eight countries, but increased in three countries, including Canada and Japan, two of the most important trading partners of the United States.

The appreciation of the dollar after 1980 has had a dramatic effect on U.S. unit labor costs relative to other countries. The following tabulation shows the average annual percentage change between 1980 and 1984 in unit labor costs measured in national currencies and in U.S. dollars:

	<i>National currency</i>	<i>U.S. dollars</i>
United States	2.1	2.1
Canada	6.4	3.9
Japan	-1.0	-2.7
Italy	14.0	-4.1
Norway	6.7	-5.8
Denmark	6.5	-8.1
Germany	1.7	-8.2
France	8.3	-9.5
Netherlands	.6	-9.9
United Kingdom	3.3	-10.2
Sweden	4.5	-12.3
Belgium	1.6	-14.2

Expressed in national currencies, seven countries had greater increases in unit labor costs than the United States.

Taking into account the appreciation of the dollar after 1980, only one country, Canada, experienced a greater increase.

Relative productivity and labor cost trends

Following is a discussion of changes in the trends of each country's manufacturing productivity and labor costs relative to a trade-weighted average for its major international competitors.¹² The indexes were constructed by taking ratios of each country's indexes to weighted geometric averages of the corresponding indexes for the other 11 countries. The weights used to combine the other 11 countries' indexes into an average "competitors" index reflect the relative importance of each country as a manufacturing trade competitor as of 1980. Prior to this article, 1975 trade weights were used. The most significant change affecting U.S. "competitors" indexes was an increase in the relative weight given to Japan, from 17 to more than 27 percent. The weights for Canada and the United Kingdom rose about 1 percent each; the weights for all other countries fell.

Annual percent changes in the ratio of each country's productivity and labor cost indexes to the trade-weighted averages of the 11 rival nations' indexes were calculated for 1960 to 1984. (See table 5.) These percent changes indicate the annual movements in each country's productivity and labor costs relative to its competitors' productivity and costs.

Relative productivity changes. The United States has experienced a long-term relative decline in productivity, compared with the trade-weighted average of the other countries—amounting to 4.0 percent per year in the 1960–73 period and 1.7 percent per year in the 1973–84 period. Norway and the United Kingdom were the only other countries to experience significant relative declines. Japan had by far the most rapid increases in relative productivity growth in both periods—6.0 percent in the 1960–73 period and 3 percent per year since 1973—followed by the Netherlands in the earlier period (1.5 percent) and by Belgium in the latter (2.5 percent). The relatively poor performance of the U.S. manufacturing sector reflects, in part, a “catching-up” by other countries.

While the United States has had a long-term relative decline in productivity, U.S. productivity growth since 1981 has equalled the trade-weighted average of the 11 foreign countries. This reflects the large U.S. productivity increase of 1983 followed by the further substantial increase of 1984.

Relative compensation. The largest 1984 relative increases in manufacturing hourly compensation, relative to changes in competitor countries, took place in France, Italy,

and Sweden. The largest relative decreases were in the three non-European countries and Germany. In the years since 1973, the largest decreases occurred in Germany, at an annual rate of more than 3 percent, and in the United States, Japan and the Netherlands, at 2- to 3-percent annual rates. Italy (at 8 percent), the United Kingdom (at 5 percent), and France (at 3 percent) recorded the largest increases.

Relative unit labor costs. In 1984, the largest increases in relative unit labor costs, measured in national currencies, were recorded by Denmark, France, Italy, Norway, Sweden, and the United Kingdom. The largest relative decreases were in Japan and the Netherlands. The United States, with a relative decrease of 0.4 percent, occupied an intermediate position. The 1984 decrease in relative U.S. unit labor costs, matched the trend for the period since 1973.

After adjustment for relative changes in foreign exchange rates, U.S. unit labor costs rose 7 percent in 1984 relative to competitors, far exceeding the 0.4-percent rise of the previous year. The 1984 U.S. increase also far exceeded the increases recorded by Japan and the three Scandinavian countries, the only other countries to have increases in relative unit labor costs in U.S. dollars. The Netherlands and

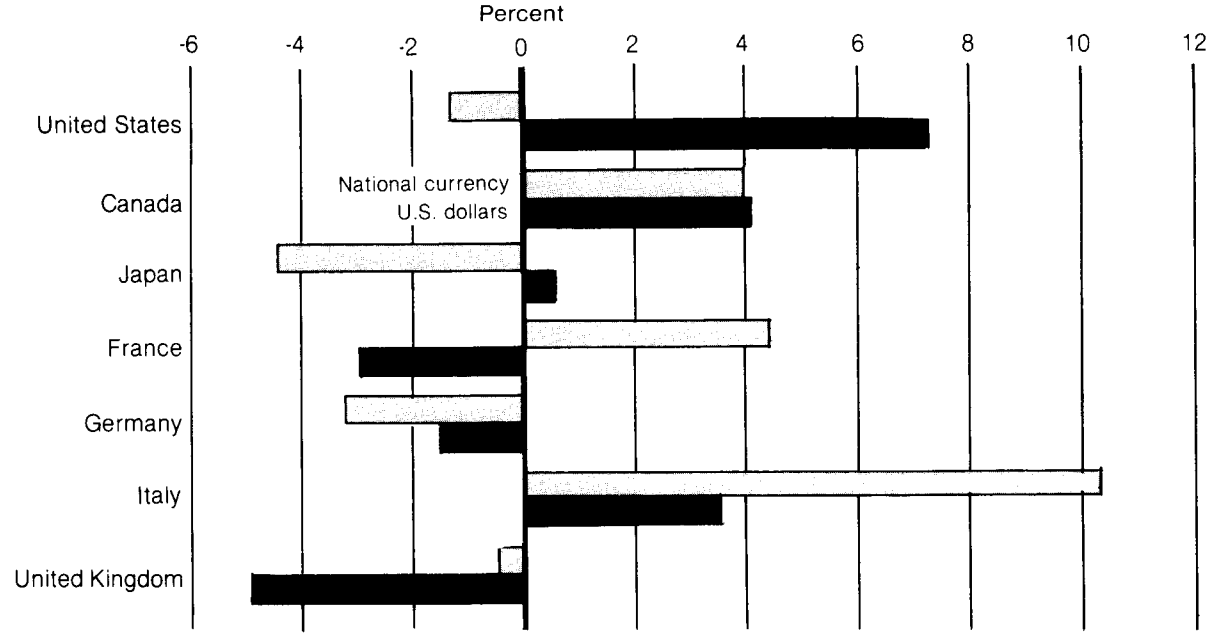
Table 5. Relative annual percent changes in output per hour, hourly compensation, and unit labor costs in manufacturing, 12 countries, 1960–84

	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Output per hour:												
1960–84	-3.0	0.1	4.5	0.6	-0.4	0.5	-1.4	2.0	0.8	1.5	-1.3	-0.1
1960–73	-3.9	.6	5.9	.7	-.3	.9	-1.5	.9	.5	1.5	-1.5	.7
1973–84	-1.7	-.9	3.0	1.0	-.5	.0	-1.3	2.5	.1	.8	-1.1	-.7
1973–80	-2.1	-.3	3.2	1.3	.1	-.3	-2.5	2.5	1.2	1.4	-1.3	-1.2
1981	-1.2	-.5	.9	.5	-1.5	.2	3.2	3.7	-1.1	-.8	-2.5	-2.6
1982	-.6	-5.4	3.5	3.3	-2.1	-1.5	1.5	1.3	-3.7	-.7	-.3	.1
1983	.8	.1	-.7	-1.4	.8	-3.2	1.6	1.2	-2.4	-.5	-.4	1.9
1984	-.5	-1.4	1.9	.2	-1.2	1.3	-.8	-1.0	-4.2	5.2	-3.1	.8
Hourly compensation:												
1960–84	-4.4	.6	3.6	.9	-2.4	5.2	2.4	.6	1.3	.5	-.1	.3
1960–73	-4.9	-.2	6.5	-.4	-.2	2.6	-.8	.8	1.9	2.7	-.1	.6
1973–84	-2.0	1.4	-2.2	3.4	-4.4	7.7	5.0	-.6	.0	-2.7	.1	.4
1973–80	-3.0	1.2	-.9	2.6	-4.7	6.9	6.8	.1	.2	-2.0	-.1	.8
1981	-1.8	5.6	-3.0	3.8	-5.0	11.5	2.5	.1	-.4	-6.0	.9	.1
1982	-.3	1.6	-3.7	8.6	-5.6	10.4	.1	-4.7	-.7	-1.8	.9	-1.4
1983	-3.1	2.8	-3.0	4.2	-2.6	9.0	.4	.2	.6	-2.5	3.5	1.6
1984	-.9	-2.6	-2.0	2.5	-2.8	5.0	1.7	.4	-.6	-.2	.7	4.3
Unit labor costs in national currency:												
1960–84	-1.4	.5	-.8	.3	-2.1	4.7	3.8	-1.3	.4	-1.0	1.3	.5
1960–73	-1.1	-.8	.6	-1.1	.1	1.7	.7	-.1	1.4	1.2	1.4	-.2
1973–84	-.3	2.4	-5.0	2.4	-4.0	7.7	6.4	-3.0	-.2	-3.5	1.2	1.1
1973–80	-.9	1.5	-3.9	1.4	-4.8	7.2	9.5	-2.4	-1.0	-3.3	1.2	2.0
1981	-.6	6.2	-3.8	3.3	-3.6	11.3	-.6	-3.4	.7	-5.2	3.4	2.8
1982	.4	7.4	-6.9	5.1	-3.6	12.1	-1.4	-5.9	3.1	-1.1	1.1	-1.5
1983	-3.8	2.7	-2.3	5.8	-3.3	12.6	-1.2	-1.0	3.1	-2.1	4.0	-.2
1984	-.4	-1.3	-3.8	2.3	-1.6	3.7	2.5	1.5	3.7	-5.1	4.0	3.5
Unit labor costs in U.S. dollars:												
1960–84	-1.9	-.4	1.6	-1.2	1.6	.3	.5	-.6	-.3	.4	2.0	-.5
1960–73	-1.7	-.8	1.6	-2.2	2.3	1.3	-1.5	.3	.5	1.6	1.7	-.1
1973–84	1.3	.1	-1.3	-.6	-.5	-.1	4.4	-3.3	-2.3	-1.9	1.1	-2.3
1973–80	-2.4	-1.9	-.2	.5	.5	-1.4	5.6	.2	-1.4	-.5	1.4	.1
1981	10.9	7.0	9.4	-4.8	-8.4	-.9	.3	-8.1	-6.0	-9.4	4.3	.7
1982	12.2	7.8	-11.9	-3.0	2.3	5.6	-5.8	-14.7	-.4	4.0	2.5	-11.5
1983	.4	4.5	7.8	-2.2	.4	8.3	-9.1	-3.7	3.1	-.7	1.0	-12.2
1984	7.2	-4.1	2.2	-1.9	-3.0	-1.4	-2.3	-.4	.6	-6.7	1.6	5.5

NOTE: Rates of change computed from the least squares trend of the logarithms of a ratio of 2 index numbers.

The ratio is the index of the reference country divided by a trade-weighted average index for the other 11 countries.

Chart 1. Average annual percentage changes in relative unit labor costs in manufacturing, seven countries, 1980-84



NOTE: Average annual percentages changes are computed from the least squares trend of the logarithms of a ratio of two index numbers. The ratio is the index of the reference country divided by a trade-weighted average index for the other 11 countries.

Canada recorded the largest decreases in relative unit labor costs in U.S. dollars, at 7 and 4 percent.

During the 1980-84 period of rapid appreciation of the U.S. dollar relative to most foreign currencies, the United States experienced a 1-percent per year decrease in relative unit labor costs in national currency terms, but a 7-percent per year increase after adjustment for the relative change in the foreign exchange value of the dollar.

Chart 1 shows the effect of adjusting relative unit labor cost changes for relative changes in foreign exchange rates over the 1980-84 period for the seven largest countries (United States, Canada, Japan, France, Germany, Italy, and the United Kingdom). Japan was the only country other than the United States to experience a much larger increase in relative unit labor costs after adjustment for changes in the exchange rate—a 4-percent per year decrease in relative unit costs before adjustment and a 1-percent per year increase after. Japan and the United States were the only two countries to record large average annual appreciations of their currencies relative to trade-weighted averages of the currencies of their competitors. (Canada, Germany, and the Netherlands registered small increases.) The relative appreciations were 9 percent for the United States and 5 percent for Japan.

The difference between the United States' annual average

increase of 7 percent in relative unit labor costs in U.S. dollars and the 1-percent increase for Japan was due partly to the greater currency appreciation experienced by the United States over the 1980-84 period. It was also due partly to the greater decrease in relative unit labor costs in national currency recorded for Japan, about 4 percent annually, compared with 1 percent for the United States. The average Japanese decrease of about 4 percent per year in relative unit labor costs in national currency units was due to a 1.4-percent increase in productivity and a 3-percent decrease in hourly compensation. The U.S. decrease of 1 percent per year in relative unit labor costs was the net result of a 1.5-percent decrease in compensation and a small decrease in relative productivity.

The effect of relative exchange rate changes on relative U.S. unit labor costs in 1980-84 contrasts sharply with the U.S. experience in 1973-80. In the earlier period, a gradual relative depreciation of the dollar converted a 1-percent average annual decline in relative unit labor costs, in national currency units, into an average annual decrease of 2.5 percent.

As the dollar appreciated from 1980 to 1984, the U.S. merchandise trade deficit steadily increased, from \$25 billion in 1980 to \$36 billion in 1982 and \$108 billion in 1984. This deficit is computed for all U.S. trading partners, not just the 11 partners examined in this study. □

— FOOTNOTES —

¹ The Federal Republic, including West Berlin.

² The data relate to all employed persons, including the self-employed, in the United States and Canada, and to all wage and salary employees in the other countries. Hours refer to hours paid in the United States; hours worked in the other countries.

Compensation comprises all payments made by employers directly to their employees (before deductions) and employer contributions to legally required insurance programs and to contractual and private welfare plans for the benefit of employees. Labor costs include, in addition to compensation, employer expenditures for recruitment and training; the cost of cafeterias, medical facilities, and other plant facilities and services; and taxes (other than social security taxes, which are part of compensation) levied on payrolls or employment rolls. Annual data are not available for total labor costs. Labor costs, as measured in the data series used for this article, approximate more closely the concept of compensation. However, compensation has been adjusted to include all significant changes in taxes that are regarded as labor costs. For the United States and Canada, compensation of self-employed workers is measured by assuming that their hourly compensation is equal to the average for wage and salary employees.

³ This article includes revised statistics which have not yet been incorporated in table 47, "Current Labor Statistics," this issue.

⁴ The new average hours series for Germany, 1960–83, is computed by the German Institut fuer Arbeitsmarkt-und Berufsforschung (Nuremberg) and refers to average hours worked by all manufacturing wage and salary employees. It is consistent with and used with the national accounts figures on the number of manufacturing employees to derive aggregate hours. The previous hours series was the product of the number of employees, from the national accounts, and average annual hours per wage worker only, from a monthly industrial survey conducted by the German Federal Statistical Office. The industrial survey data were used for the preliminary 1984 figure.

⁵ The new output series for the years beginning with 1969 is value added from the Netherlands national accounts. The figures include petroleum refining from 1977, but exclude petroleum refining over the 1969–77 period. The series previously used for these years was the index of industrial production for manufacturing prepared by the Central Bureau of Statistics. This measure was used because the previous national accounts figures for manufacturing included natural gas and petroleum extraction.

⁶ The new output series for the United Kingdom, for the years beginning with 1976, is the index of output in manufacturing at constant factor cost, with separate manufacturing industries combined using weights proportional to the distribution of net output in 1980, that is published with the

national accounts. The series previously used for these years was the 1975-based index of manufacturing production; this series is still used for the years before 1976. The 1980-based series, unlike the earlier one, excludes the refining of oil and the processing of other energy-related materials from the definition of manufacturing and includes extraction of non-fuel minerals. This corresponds with the European Community definition of manufacturing. The employment and compensation series beginning 1976 have also been replaced with series consistent with this revised definition of manufacturing.

⁷ Donato Alvarez and Brian Cooper, "Productivity trends in manufacturing in the U.S. and 11 other countries," *Monthly Labor Review*, January 1984, pp. 52–58.

⁸ Although the labor productivity measure relates output to the hours of persons employed in manufacturing, it does not measure the specific contributions of labor as a single factor of production. Rather, it reflects the joint effects of many influences, including new technology, capital investment, the level of output, capacity utilization, energy use, and managerial effectiveness, as well as the skills and efforts of the work force.

⁹ The exception was the paper and printing industry in France. Arthur Neef and Edwin Dean, "Comparative Changes in Labor Productivity and Unit Labor Costs by Manufacturing Industry: United States and Western Europe," presented at a conference on Interindustry Differences in Productivity Growth, American Enterprise Institute, Washington, D.C., October 1984. This paper also examines the possible role of industry-specific events in determining the post-1973 slowdown. See also Irving Kravis and Robert Lipsey, "The Diffusion of Economic Growth in the World Economy, 1950–80," in John W. Kendrick, ed., *International Comparisons of Productivity and Causes of the Slowdown* (Cambridge, MA, Ballinger, 1984).

¹⁰ Incomes Data Services Ltd., *IDS International Report* (London), May 1983, June 1983, March 1984, October 1984, and July 23, 1985.

¹¹ Incomes Data Services Ltd., *IDS International Report* (London), October 1984.

¹² The trade weights were adapted from weights developed by the International Monetary Fund (IMF). The original IMF weights cover 17 countries; the 11 foreign countries covered by this article account for 94 percent of the U.S. competitors' total trade weight. For more information about the relative indexes of manufacturing productivity and costs, see Patricia Capdevielle, Donato Alvarez, and Brian Cooper, "International trends in productivity and labor costs," *Monthly Labor Review*, December 1982, pp. 3–14. The weights are available from the authors, as are the relative indexes for each country and the underlying "own country" and "competitor countries" indexes used to compute the relative indexes. Indexes of trade-weighted exchange rates are also available from the authors.

Publications Awards

The *Monthly Labor Review* was one of five Bureau of Labor Statistics publications honored in the annual competition sponsored by the Washington chapter of the Society for Technical Communication. The competition was open to publications produced in 1985 by trade associations, private research and educational institutions, corporations, and government agencies. Contest criteria included audience definition, writing, editing, and graphics.

In addition to the *Review*, BLS publications honored were *The First Hundred Years of the Bureau of Labor Statistics*, *Trends in Manufacturing: A Chartbook*, *New from BLS*, and the *Occupational Outlook Quarterly*.
