

Productivity trends in manufacturing in the U.S. and 11 other countries

For the U.S. and most industrial rivals, output per hour in manufacturing rose in 1982; unit labor costs, measured in U.S. dollars, increased by 12 percent in the U.S. in comparison to the other 11 nations

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Labor productivity in manufacturing increased from about 1 to 5 percent in 1982 in the United States, Japan, and in eight of nine European countries studied. Only Canada and, marginally, Norway registered declines in output per hour. These generally favorable results occurred in a year that was, for most countries, the second or third year of economic stagnation. Manufacturing output fell in every country except Japan, Belgium, and Denmark. Therefore, with the exception of these three countries, the recorded gains in labor productivity resulted entirely from reductions in employment and hours. The United States, along with Italy, Denmark, and Sweden, registered the smallest productivity gains and, next to Canada, the largest declines in output, employment, and hours.

Unit labor costs, which reflect changes in both output per hour and hourly compensation costs, declined in Japan, but rose in all other countries. The increases varied from under 1 percent in Belgium to 3 to 6 percent in West Germany¹, the Netherlands, Sweden, and the United Kingdom to 7 percent in the United States, to about 9 to 11 percent in Denmark, France, and Norway, and to more than 15 percent in Canada and Italy.² However, when measured in U.S. dollars—to take account of relative changes in exchange rates—Canada was the only country besides the United States to show an increase.

U.S. manufacturing unit labor costs rose steeply in 1981 and 1982 relative to a trade-weighted average for the 11 rival industrial countries—thereby canceling much of the gains in comparative unit labor costs that U.S. manufacturers experienced during most of the 1970's. All of the recent increase, however, resulted from the appreciation of the U.S. dollar. Measured on a national currency basis, U.S. unit labor costs fell nearly 2 percent in 1981 relative to the other countries and remained unchanged in 1982. Measured on a dollar basis, the United States posted relative increases of more than 12 percent in both 1981 and 1982. As a result, the competitive unit labor cost position of U.S. manufacturers in 1982, on average, was about equivalent to that in 1972.

The data for 1982 are preliminary, while those for other recent years include revised statistics for several countries. In addition, new long-term series on output, labor input, and labor costs have been introduced for France³ and new labor input series have been introduced for Germany, the United Kingdom, and Belgium.⁴ The new series for Germany and the United Kingdom affect the year-to-year movements in output per hour and hourly compensation but have no effect on the unit labor cost measures. The data series for Norway are being published for the first time.⁵

Productivity and output trends

In 1982, manufacturing productivity increased about 3 to 5 percent in Japan, Belgium, France, the Netherlands, and

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Table 1. Annual percent changes in manufacturing productivity, 12 countries, 1960-82

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden	Eleven foreign countries (weighted) ¹
Output per hour:													
1960-82	2.6	3.6	9.2	5.8	5.1	5.7	3.6	7.2	5.9	7.0	3.7	4.8	5.6
1960-73	3.0	4.5	10.7	6.7	5.7	6.9	4.4	7.0	6.4	7.6	4.5	6.6	6.6
1973-82	1.7	1.6	7.2	4.5	3.6	3.7	1.8	6.0	4.1	4.8	2.0	2.2	3.8
1973-79	2.0	2.4	6.8	5.4	4.5	3.0	1.6	6.8	4.5	5.8	1.8	2.0	4.2
1980	.2	-2.3	9.5	1.5	1.4	5.8	-1.0	2.6	1.4	2.1	2.6	1.6	2.2
1981	3.5	2.5	5.7	2.4	2.3	3.5	6.7	5.6	7.1	2.4	1.9	.4	3.6
1982	1.2	-2.7	4.1	4.8	1.7	1.3	3.8	5.1	1.0	3.3	-2	1.3	2.0

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.

the United Kingdom, and about 1 to 2 percent in the United States, Denmark, Germany, Italy and Sweden.⁶ (See table 1.) Canadian output per hour dropped by nearly 3 percent, while Norway showed a marginal decline.

In the United States and six of the nine other countries that had increases in manufacturing productivity, the rates of growth in 1982 were smaller than in 1981. Only France, the Netherlands, and Sweden showed larger increases.

Although productivity rose in 10 of the 12 countries studied, only Japan and Denmark recorded significant 1982 gains in output. (See table 2.) Output remained nearly unchanged in Belgium and fell in each of the other countries. The declines were largest in Canada and the United States, about 12 and 7 percent. Among the European countries, Germany had the largest decrease in output, about 3 percent.

Japan, the postwar leader in productivity growth, posted a rise in 1982 in both output per hour and total output, about 4 percent and 3 percent. However, 1982 marked the second consecutive year in which the rates of increase of both manufacturing productivity and output were smaller than those of the preceding year.

In 1982, most of the industrialized world continued the pattern of economic stagnation that began in 1980 or, for some countries, 1981. For the United States, manufacturing output in 1982 was the lowest since 1976. German output dropped to its lowest level since 1978 and British output to its lowest point since 1967. Only two countries, Japan and Denmark, experienced a sustained increase in output from 1980.

The 1982 productivity increases in the United States, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom reflected declines in output accompanied by larger decreases in hours. (See tables 2 and 3.) In Canada and Norway, the only countries to show productivity decreases, output and hours both fell, but the drop in output was larger than the decrease in hours.

Employment and hours

Employment and total hours in manufacturing decreased in every country in 1982, with the exception of Denmark, where hours increased about 1 percent. (See table 3.) This was at least the second consecutive year of decline in both these measures for the United States and the European countries other than Denmark. Canada registered the most substantial 1982 drop in employment, 9 percent, while Japan and Denmark showed declines of less than 1 percent. In the United States, employment decreased by more than 6 percent, the third year of decline, bringing total employment in manufacturing to a level about 10 percent lower than in 1979 and to its lowest point since 1975. In Canada, the sharp 1982 drop in employment brought its level below any year since 1972.

In most of the European countries, the recent slowdown only accentuated prerecession trends in employment. The 1982 declines in employment, in most cases, brought manufacturing employment levels to their lowest points since the early 1960's. In the United Kingdom and the Netherlands, 1982 employment was lower than in any year since

Table 2. Annual percent changes in manufacturing output, 12 countries, 1960-82

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Output:												
1960-82	3.4	4.5	9.9	5.4	3.6	5.2	1.3	4.8	3.8	4.5	3.0	3.0
1960-73	4.7	6.3	13.0	7.3	5.2	6.8	3.0	6.5	5.2	6.4	4.8	5.0
1973-82	1.7	1.3	6.9	2.1	1.4	3.0	-2.0	1.1	1.8	1.6	-2	-4
1973-79	2.9	2.5	5.7	3.2	2.0	2.9	-5	1.8	1.7	1.8	-4	-5
1980	-4.4	-2.9	10.8	.4	.5	6.3	-9.1	-1.0	.0	1.7	1.3	.4
1981	2.9	2.1	6.6	-2.0	-1.9	-.9	-6.4	-2.3	.5	-9	-1.0	-3.3
1982	-6.9	-12.3	3.4	-6	-2.6	-1.8	-7	.5	1.8	-9	-2.0	-2.2

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 3. Annual percent changes in manufacturing employment and hours, 12 countries, 1960-82

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Aggregate hours:												
1960-82	0.7	0.9	0.6	-0.4	-1.4	-0.4	-2.2	-2.3	-2.0	-2.3	-0.6	-1.8
1960-73	1.6	1.7	2.1	.6	-.5	-.1	-1.3	-.5	-1.1	-1.1	.2	-1.5
1973-82	.0	-.2	-.3	-2.3	-2.1	-.7	-3.8	-4.6	-2.2	-3.1	-2.2	-2.5
1973-79	.9	.1	-1.1	-2.0	-2.4	-.1	-2.1	-4.7	-2.6	-3.7	-2.1	-2.4
1980	-4.5	-.7	1.2	-1.0	-.9	.5	-8.1	-3.5	-1.4	-.4	-1.3	-1.2
1981	-.6	-.4	.8	-4.3	-4.1	-4.3	-12.3	-7.5	-6.1	-3.2	-2.8	-3.7
1982	-8.0	-9.9	-.7	-5.1	-4.3	-3.0	-4.3	-4.4	.8	-4.0	-1.8	-3.4
Employment:												
1960-82	.8	1.2	1.4	.4	-.5	1.0	-1.4	-.9	-.8	-1.2	.6	-.4
1960-73	1.5	1.9	3.0	1.1	.3	1.4	-.6	-.5	.2	.0	1.2	-.2
1973-82	.2	.1	-.4	-1.5	-1.2	-.2	-3.1	-3.7	-1.8	-2.5	-.8	-1.2
1973-79	.9	.4	-1.1	-1.2	-1.6	.1	-1.6	-3.8	-1.9	-2.6	-.3	-.9
1980	-3.4	-.3	1.2	-1.4	.6	.2	-5.0	-2.0	-2.0	-1.2	-.8	-.1
1981	-.5	.2	1.4	-3.5	-2.5	-1.9	-11.1	-5.4	-4.9	-3.1	-2.1	-3.1
1982	-6.5	-9.3	-.5	-2.0	-3.7	-2.2	-6.0	-4.5	-.5	-4.4	-1.5	-3.9
Average hours:												
1960-82	-0.1	-0.3	-0.8	-0.8	-0.9	-1.4	-0.8	-1.3	-1.3	-1.2	-1.2	-1.4
1960-73	-.1	-.2	-.9	-.5	-.8	-1.5	-.7	-1.0	-1.4	-1.1	-1.0	-1.3
1973-82	-.3	-.3	.1	-.8	-.9	-.4	-.7	-.9	-.4	-.7	-1.4	-1.3
1973-79	0.0	-.3	0.0	-.9	-.8	-.3	-.5	-1.0	-.7	-1.1	-1.8	-1.5
1980	-1.1	-.4	-.1	.3	-1.5	.3	-3.3	-1.5	.7	.8	-.4	-1.1
1981	-.1	-.6	-.6	-.7	-1.6	-2.4	-1.3	-2.2	-1.3	-.1	-.7	-.6
1982	-1.7	-.7	-.2	-3.2	-.6	-.8	1.8	0.1	1.3	.4	-.3	.5

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.

1950. Among all the other European nations, with the exception of Italy, employment in 1982 was lower than in any other year in the 1970's or 1980's.

Most countries also experienced long-term declines in aggregate hours in manufacturing. The United States, Japan, and Canada had almost no overall change in aggregate hours during 1973-82, but all the European countries recorded downward trends in hours over this 10-year period. The reductions that took place in most of the European countries were due primarily to the fall in employment. However, all the European countries also reduced average hours during the period.

The sharp declines in employment and hours that took place during 1980-82, a period of recession for most industrialized countries, reflect the practices followed by employers to accommodate the reduced level of demand for output. In most countries, the 1982 reductions in total hours were brought about either entirely or primarily by reducing employment. In the United States, for example, employment declined by more than 6 percent and average hours by less than 2 percent. The exception to this pattern was France, which recorded a substantial decline of more than 3 percent in average hours, while keeping the decline in employment to 2 percent.

Statutory provisions entitling most workers to a basic 39-hour week, instead of a 40-hour norm, took effect in France in February 1982. The statutes also increased paid leave from four to five weeks leading to a further reduction in annual working time. In addition, a French Government ordinance granting part timers rights comparable to those enjoyed by full-time employees became effective in March 1982.

Aside from France, average hours in the European countries either increased or decreased at a reduced pace. In the United Kingdom, average hours rose by 1.8 percent, even though employment fell about 6 percent, as the proportion of all manufacturing operatives working overtime increased while the average number of operatives working on short time declined markedly. Small 1982 increases in average hours of about 1 percent or less were recorded in Belgium, Denmark, the Netherlands, and Sweden and small decreases of less than 1 percent in the other European nations. These changing patterns in the trend of average hours occurred while all of the European nations were experiencing at least the second straight year of substantial cutbacks in employment.

Hourly compensation and unit labor costs

In 1982, most countries had lower rates of growth in hourly compensation than in 1981. (See table 4.) Japan had the smallest increase, 3.4 percent, followed by Belgium, Germany, Sweden, and the Netherlands with increases of about 5 to 7 percent, while France and Italy had the largest rises, 17 and 18 percent.

France and the Netherlands were the only countries not to show some degree of moderation in hourly compensation rates for 1982. In the Netherlands, however, a substantial slowdown had occurred in 1980-81. The most significant moderations in 1982 occurred in the United Kingdom, Japan, Sweden, and Belgium. The growth in hourly compensation fell markedly in the United Kingdom, from about 17 percent in 1981 to 9 percent in 1982.

Increases in unit labor costs reflect the extent that increases in hourly compensation outstrip gains in labor pro-

Table 4. Annual percent changes in hourly compensation and unit labor costs in manufacturing, 12 countries, 1960-82

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden	Eleven foreign countries (weighted) ¹
Hourly compensation:													
1960-82	7.0	9.0	14.4	12.5	10.0	16.5	13.4	12.3	13.2	12.7	11.7	11.9	12.1
1960-73	5.0	6.4	14.6	9.6	9.6	12.3	8.7	10.5	11.8	12.8	9.8	10.4	10.1
1973-82	9.5	11.8	9.1	15.4	8.5	19.6	17.8	11.1	12.2	9.1	12.1	12.3	12.3
1973-79	9.3	12.2	11.4	16.0	9.2	20.5	19.0	13.5	13.5	11.4	13.8	14.4	13.4
1980	11.7	10.4	7.9	14.1	8.8	18.9	21.6	9.6	10.9	5.2	11.0	11.1	11.7
1981	9.9	14.8	6.3	16.0	7.6	22.1	17.2	8.9	10.6	5.0	12.1	10.8	12.0
1982	8.5	12.2	3.4	16.7	5.5	18.1	9.1	5.3	9.8	6.5	10.2	7.2	9.3
Unit labor costs:													
1960-82	4.3	5.2	4.8	6.3	4.7	10.2	9.5	4.7	6.8	5.3	7.7	6.8	6.1
1960-73	1.9	1.8	3.5	2.7	3.7	5.1	4.1	3.3	5.1	4.8	5.1	3.5	3.4
1973-82	7.7	10.0	1.8	10.4	4.7	15.4	15.7	4.9	7.8	4.1	9.8	10.0	8.1
1973-79	7.2	9.6	4.3	10.1	4.6	16.9	17.1	6.3	8.6	5.3	11.8	12.1	8.9
1980	11.5	12.9	-1.5	12.4	7.3	12.4	22.9	6.8	9.4	3.0	8.2	9.3	9.3
1981	6.1	12.1	0.5	13.4	5.1	18.0	9.9	3.1	3.3	2.5	10.1	10.4	8.1
1982	7.2	15.3	-0.7	11.3	3.8	16.5	5.1	.2	8.7	3.2	10.4	5.8	7.1
Unit labor costs in U.S. dollars:													
1960-82	4.3	4.7	7.6	6.3	8.8	7.4	7.3	7.0	7.5	8.3	9.6	7.4	7.1
1960-73	1.9	1.9	4.9	2.4	6.1	5.4	2.6	4.4	5.0	6.1	6.0	4.3	4.0
1973-82	7.7	7.0	5.1	7.8	7.5	6.8	13.5	5.5	5.6	6.0	9.3	7.1	7.5
1973-79	7.2	6.4	9.7	10.5	11.0	9.2	12.7	11.3	10.8	10.9	13.7	12.0	9.9
1980	11.5	13.1	-4.7	13.3	8.3	9.2	34.6	7.3	2.2	4.0	11.0	10.9	10.0
1981	6.1	9.3	3.1	-11.6	-15.3	-10.8	-4.4	-18.7	-18.1	-18.2	-5.4	-7.3	-5.8
1982	7.2	12.0	-12.2	-8.5	-3.7	-2.6	-9.2	-19.0	-7.5	-3.9	-1.8	-15.2	-4.6

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.

ductivity. In 1982, unit labor costs increased in all countries with the exception of Japan, but Canada and Denmark were the only countries to record significantly higher rates in 1982 than in 1981. The United States, Norway, and the Netherlands showed modestly larger increases. However, the increase in the Netherlands, about 3 percent, was still very moderate.

The most substantial 1982 slowdowns in unit labor costs were recorded in Belgium, Sweden, and the United Kingdom. For Belgium and the United Kingdom, this was the second consecutive year of substantial moderation. The slowdown in Sweden reflected both a smaller compensation increase and larger productivity gain, while the moderations in Belgium and the United Kingdom were due solely to declines in compensation increases. Moderation in unit labor cost increases in 1982 in Germany and Italy and the decline in Japan reflected slowdowns in hourly compensation gains; in France, it was due solely to the large productivity gain.

Unit labor costs 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 1982, 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 3 percent versus the Canadian dollar, 7 percent versus the German

mark and the Dutch guilder, and 11 to 20 percent versus the currencies of all the other countries. This was the second straight year in which the dollar appreciated against the currencies of each of these countries with the exception of the Japanese yen, which rose against the dollar in 1981.

In 1982, as in the previous year, unit labor costs in U.S. dollars dropped in almost every country. In 1981, Canada and Japan were the only countries to post increases; in 1982, only Canada showed an increase. Measured in U.S. dollars, unit labor costs declined about 2 to 4 percent in Germany, Italy, the Netherlands, and Norway; 7 to 9 percent in France, Denmark, and the United Kingdom; 12 percent in Japan; and 15 percent in Sweden and 19 percent in Belgium. In Canada, unit labor costs rose less in U.S. than Canadian dollars, but still more than U.S. costs.

The total effect of U.S. dollar appreciation on unit labor costs during the last 2 years is critical. On a national currency basis, the increase in U.S. unit labor costs was relatively low. Only Japan, Belgium, Denmark, Germany, and the Netherlands posted lower cost increases. However, when converted to a U.S. dollar basis, only the Canadian increase exceeded that of the United States. The following tabulation shows each country's total percentage change in unit labor costs over the 2-year period, as measured in national currencies and on a U.S. dollar basis:

	National currency	U.S. dollars
United States	13.8	13.8
Canada	29.2	22.4
Japan	-.1	-9.5

Belgium	3.3	-34.1
Denmark	12.3	-24.2
France	26.2	-19.1
Germany	9.1	-18.4
Italy	37.5	-13.1
Netherlands	5.8	-21.4
Norway	21.4	-7.2
Sweden	16.8	-21.4
United Kingdom	15.5	-13.2

Relative productivity and labor cost trends

Trends in labor productivity and unit labor costs are often used in analyses of changes in the international trade of manufactures. This section examines changes in the trends of each country's own productivity and labor costs relative to a trade-weighted average of its major international competitors.⁷ Indexes of a country's relative productivity and labor costs were constructed by taking ratios of each country's own 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.

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 1982. These percent changes, shown in table 5, indicate the annual movements in each country's productivity and labor costs relative to its competitors' productivity and costs.

Relative productivity changes. Table 5 indicates that U.S. manufacturing productivity has experienced a relative decline compared to the trade-weighted average of the other countries. Over the 1960-82 period, the average annual productivity growth rate was nearly 3 percent higher in rival countries; in 1982, almost 1 percent higher.

In 1982, manufacturing productivity in Canada and Norway fell substantially, by about 3 to 4 percent, relative to the positions of their competitors. Smaller relative declines occurred for Germany, Italy, Sweden, and Denmark. Manufacturing productivity increased in 1982 in the other five countries, relative to their competitors, with France recording the largest relative increase, almost 3 percent. Over the entire period since 1960, Japan shows the largest relative increase, followed by Belgium and the Netherlands, while the United States shows the largest relative decline, followed by the United Kingdom and Norway. A similar pattern has prevailed since 1973.

Table 5. Relative annual percent changes in output per hour, hourly compensation and unit labor costs in manufacturing, 12 countries, 1960-82.

Year	United States	Canada	Japan	France	Germany	Italy	United Kingdom	Belgium	Denmark	Netherlands	Norway	Sweden
Output per hour:												
1960-82	-2.8	0.2	4.7	0.6	-0.3	0.4	-1.6	1.7	0.8	1.6	-1.7	-0.2
1960-73	-3.3	.6	5.5	.7	-.5	.9	-1.6	.7	.4	1.5	-1.8	.7
1973-82	-2.0	-.7	4.2	.9	-.2	.0	-1.8	2.1	.6	1.0	-1.6	-1.3
1973-79	-2.1	-.1	3.5	1.5	.4	-1.1	-2.4	2.4	.8	1.5	-2.1	-1.8
1980	-2.0	-3.1	8.4	-.9	-1.1	3.8	-3.3	.6	-.6	.2	.3	-.3
1981	-.1	-1.1	2.2	-1.3	-1.5	-.1	3.3	2.4	3.6	-1.1	-1.8	-3.4
1982	-.8	-4.3	2.0	2.5	-1.3	-1.3	1.4	2.2	-1.4	.5	-2.6	-1.1
Hourly compensation:												
1960-82	-4.5	.6	3.7	.8	-2.0	4.9	2.2	.4	1.3	1.2	-.2	.5
1960-73	-4.6	-.1	5.9	-.3	-.3	2.6	-.7	.4	1.8	2.9	-.3	.8
1973-82	-2.4	1.4	-2.4	3.3	-4.2	7.9	6.1	-.9	.1	-2.2	.2	.4
1973-79	-3.6	1.6	-.9	2.9	-4.5	7.7	6.2	.3	.2	-1.0	.6	1.3
1980 .....	.0	-1.3	-4.1	1.9	-3.8	7.0	9.6	-2.0	-1.2	-5.9	-.7	-1.0
1981	-1.9	4.2	-4.8	4.5	-4.6	11.1	6.1	-2.3	-.7	-5.5	1.1	-.5
1982	-.7	3.5	-5.5	8.0	-4.4	9.8	.3	-3.9	1.3	-1.8	1.9	-1.4
Unit labor costs in national currency:												
1960-82	-1.7	0.4	-1.0	0.2	-1.7	4.4	3.8	-1.3	0.5	-0.4	1.5	0.7
1960-73	-1.4	-.6	.4	-.9	.2	1.7	.8	-.3	1.4	1.4	1.5	.1
1973-82	-.4	2.1	-6.4	2.4	-4.0	8.0	8.1	-2.9	-.6	-3.2	1.8	1.7
1973-79	-1.5	1.7	-4.3	1.4	-4.9	8.9	8.8	-2.0	-.6	-2.5	2.7	3.2
1980	2.0	1.8	-11.5	2.8	-2.7	3.1	13.4	-2.6	-.6	-6.1	-1.0	-.7
1981	-1.8	5.4	-6.9	6.0	-3.2	11.2	2.7	-4.5	-4.1	-4.4	3.0	3.0
1982 .....	.1	8.1	-7.4	5.3	-3.1	11.2	-1.1	-6.0	2.7	-2.3	4.6	-.3
Unit labor costs in U.S. dollars:												
1960-82	-2.6	-.4	1.1	-1.0	2.0	.2	.4	-.5	.2	.9	2.2	.3
1960-73	-2.0	-.6	1.3	-2.0	2.4	1.1	-1.4	-.1	.8	1.8	1.8	.2
1973-82 .....	.2	-.7	-2.7	.1	-.1	-.9	6.0	-2.2	-2.3	-1.6	1.5	-.7
1973-79	-2.5	-1.6	.1	.3	.8	-1.0	2.7	.6	.1	.3	2.9	1.6
1980	1.4	1.7	-15.4	2.9	-2.5	-.9	24.6	-3.2	-8.5	-6.1	.8	-.1
1981	12.7	6.6	9.0	-4.1	-9.2	-2.9	2.8	-8.8	-11.5	-9.8	1.6	-.4
1982	12.4	8.5	-10.7	-4.2	2.8	2.7	-5.5	-14.3	-1.2	2.5	5.6	-11.4

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.

Recent developments

Current economic data available when this article was prepared indicated that the United States and some of the other countries covered were emerging from the recessionary trends that generally prevailed throughout 1982. The United States has shown the most dramatic recovery, with manufacturing output increasing strongly and at an accelerating pace in each of the first three quarters of 1983.

By mid-year, there were also signs of more moderate turnarounds in Canada, Germany, and Sweden. In addition, manufacturing output in Japan, one of the few countries in which output rose in 1982, was increasing at a more rapid pace. In other countries, however, including France, Italy, and the United Kingdom, little overall change, or additional declines in manufacturing output, were experienced in the first half of 1983.

Manufacturing productivity and unit labor cost indicators through the first half of 1983 were available only for the United States, Japan, Germany, and the United Kingdom. Productivity was rising in each of the four countries and, with the possible exception of the United Kingdom, unit labor costs were falling. In the third quarter of 1983, U.S. manufacturing productivity rose at a 12-percent annual rate—the largest gain since the fourth quarter of 1980—and unit labor costs declined at an 8-percent annual rate—the largest drop since 1975.

Relative compensation. The largest 1982 increases in manufacturing hourly compensation, relative to changes in competitor countries, occurred in France and Italy; the increases were between 8 and 10 percent. Relative decreases in hourly compensation ranged from about 1 percent in the United States to more than 5 percent in Japan. In the United States, a steady decline in relative hourly compensation has occurred since 1960, though the declines since 1977 have been comparatively small. Germany is the only other country with a significant long-term relative decline. Italy and Japan have had the largest relative increases in hourly compensation since 1960; however, Japan has had a relative decline in hourly compensation since 1975.

Relative unit labor costs. Relative unit labor costs, measured in national currencies, fell in 1982 in Japan, Belgium, Germany, the Netherlands, Sweden, and the United Kingdom. The relative trends ranged from about 6–7 percent lower in Japan and Belgium to about 1 percent or less in Sweden and the United Kingdom, which recorded its first drop in relative unit labor costs since 1973.

Over the years 1960–1977, the U.S. trend in unit labor

costs relative to the 11 other countries was steadily downward. This decline reflected the joint influence of the relative declines in U.S. productivity and in hourly compensation: though U.S. relative productivity fell over this period, the relative decline in hourly compensation was greater. Relative unit labor costs increased from 1977 to 1980, fell in 1981, and remained stable in 1982. Over the full 1960 to 1982 period, the United States, Belgium, and Germany had the largest relative declines in unit labor costs, followed by Japan; Italy and the United Kingdom had the largest relative increases. Since 1973, Japan, followed by Germany, has had the largest relative decline; Italy and the United Kingdom have continued to have the largest relative increases.

In U.S. dollars. After adjustment for the relative change in the foreign exchange rate of the dollar, U.S. unit labor costs rose more than 12 percent in 1982 relative to competitors, matching the sharp increase of the previous year. Relative unit labor costs adjusted for relative exchange rate changes were up more than 8 percent in Canada and about 3 to 6 percent in Germany, Italy, the Netherlands, and Norway. For the Netherlands, this was the first increase in five years. The revaluations of the German mark and the Dutch guilder within the European Monetary System offset declines in relative unit labor costs in national currency in both countries. Relative unit labor costs in U.S. dollars rose in Italy despite a drop of 8 percent in the trade-weighted exchange rate.

In Belgium, relative unit labor costs in U.S. dollars fell 14 percent in 1982, nearly matching the largest relative declines recorded by any country (Japan in 1979 and 1980) over the 1960–82 period. Sweden and Japan also recorded large relative decreases in 1982—11 percent; France and the United Kingdom experienced relative declines of about 4 and 6 percent.

Despite the large 1981–82 relative increases, U.S. unit labor costs have still fallen by 2.6 percent per year relative to competitors since 1960. The only other countries to show relative declines measured in U.S. dollars over this 23-year period were Canada, Belgium, and France—1 percent or less per year. Germany and Norway had the largest relative increases—about 2 percent per year. Since 1973, however, U.S. unit labor costs have risen on a par with its competitors, whereas Japan, Belgium, Denmark, and the Netherlands have registered significant declines relative to their competitors, led by a 2.7 percent annual relative decline in Japan. The only countries with large relative increases since 1973 are the United Kingdom—6 percent per year—and Norway. □

—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 BLS has introduced a new series on output, employment, and employee compensation for France beginning 1959 and a revised average hours series beginning 1970. The new series on output, employment, and compensation refer to mining and manufacturing less energy-related products. The principal differences from the U.S. definition of manufacturing are the exclusion of petroleum refining and the inclusion of some mining. This change has been made because consistent series for manufacturing, as defined in the United States, are not available for France. All the new series are from the French national accounts. Previously, the employee compensation figures from 1965 were BLS estimates. The new average hours worked series is based on scheduled hours adjusted to an hours worked basis by the *Institut national de la Statistique et des Etudes économiques* (INSEE). Previously, BLS made its own estimated adjustments.

⁴ The new employment series for Germany is a comprehensive series prepared by the German Federal Statistical Office which covers all employees in manufacturing, including manufacturing handicrafts. It is therefore consistent with the national accounts measures of output and employee compensation. The previous series, based on a monthly establishment survey, excluded all manufacturing handicrafts and establishments with less than 10 employees prior to 1970; beginning 1970, it included handicrafts, but excluded all establishments with less than 20 employees. The establishment survey still provides the trend measure for average hours.

The new employment series for the United Kingdom is on a "census of employment" basis and is constructed by the British Department of Employment. The Census of Employment was first conducted in 1971. Figures for earlier years based on a count of national insurance cards were adjusted for consistency and linked to the census of employment series by the Department of Employment. The previous employment series used by BLS was derived from the Census of Production. According to the British Central Statistical Office, employment data available from the Census of Production are less reliable than the Department of Employment series for use as time series alongside the output measure.

BLS has also incorporated a new average hours worked series for the United Kingdom beginning 1976. The new series, prepared by the Department of Employment, includes adjustments for changes in holiday and vacation entitlements. Previously, adjustments for holiday and vacation trends were made by BLS; adjustments prior to 1976 are still BLS estimates.

For Belgium, a new average hours worked series for production workers has been introduced from 1960. The new series is based on data on aggregate wage worker hours and employment from a monthly industrial survey. The previous series was based on a survey of hours and earnings in April and October only, with adjustment by BLS for estimated changes in annual holiday and vacation leave. This change affects unit labor costs as well as output per hour because total labor costs are computed as the product of hourly compensation and total hours.

⁵ The indexes for Norway were compiled from basic series on manufacturing output, aggregate employee compensation, and employment published with the Norwegian national accounts and average hours worked computed by BLS from industrial survey statistics. The output measure is calculated within the framework of annual input-output tables compiled using statistics from an annual industrial survey. Data on wages and salaries are also obtained from the annual industrial survey; data on other labor expenditures from administrative statistics. The employment data are official estimates of the average number of employees obtained primarily from the annual industrial survey. Average hours worked refer to production workers only; they were computed from statistics on aggregate wage-earner hours and the number of wage earners in establishments with 5 or more employees.

⁶ 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.

⁷ The trade weights were adapted from weights developed by the International Monetary Fund and described in "Intercountry Cost and Price Comparisons," a paper by Michael C. Deppler, Research Department, IMF, November 1979. 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.