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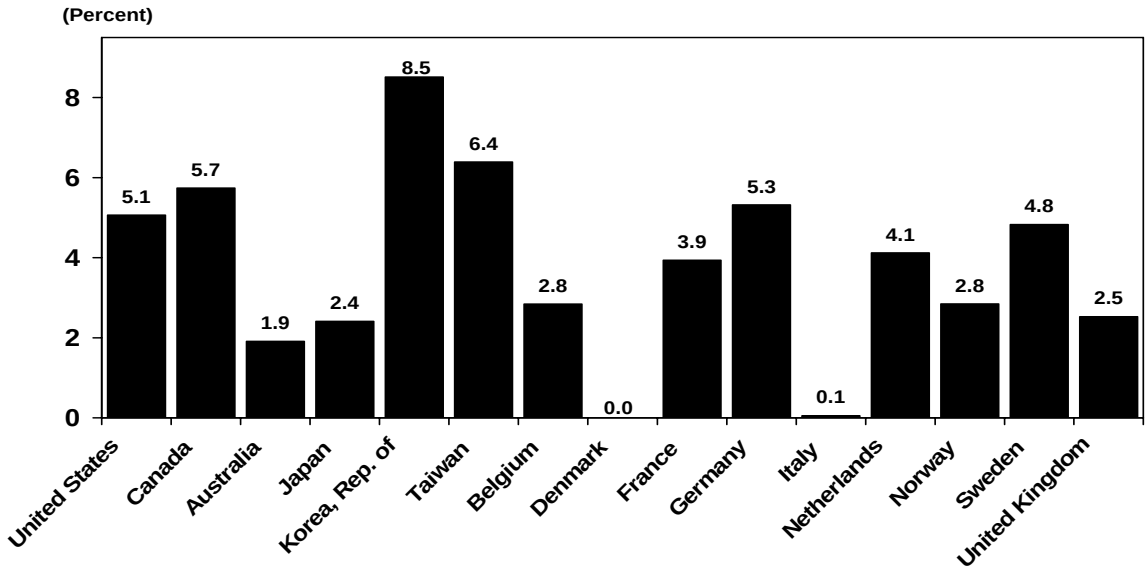
INTERNATIONAL COMPARISONS OF MANUFACTURING PRODUCTIVITY AND UNIT LABOR COST TRENDS, 2005

Manufacturing labor productivity increased in 14 of the 15 economies covered by the U.S. Department of Labor's Bureau of Labor Statistics in 2005. Denmark, which experienced no change in productivity, was the lone exception.

The U.S. increase of 5.1 percent continued a more than decade-long trend of relatively high productivity growth in manufacturing. Since 1995, only the Republic of Korea and Sweden had greater productivity growth.

The data presented here differ from those appearing in the BLS Productivity and Costs news releases. (See technical notes.) Average annual growth rates for selected measures over various time periods are in tables A and B.

Chart 1. Percent change in manufacturing output per hour, 2004-2005



Manufacturing unit labor costs, expressed in national currency units, declined in nine of the economies and increased in six. The change for the United States was near the middle of the range, at -0.4 percent.

Expressed in U.S. dollars, unit labor costs declined in six of the countries and increased in nine. This shift from a decline in unit labor costs in national currency to an increase in unit labor costs expressed in U.S. dollars can be accounted for by the relative appreciation of the currencies of the Republic of Korea, Canada, and Taiwan. (See chart 2 and table A.)

Chart 2. Percent change in manufacturing unit labor costs, 2004-2005

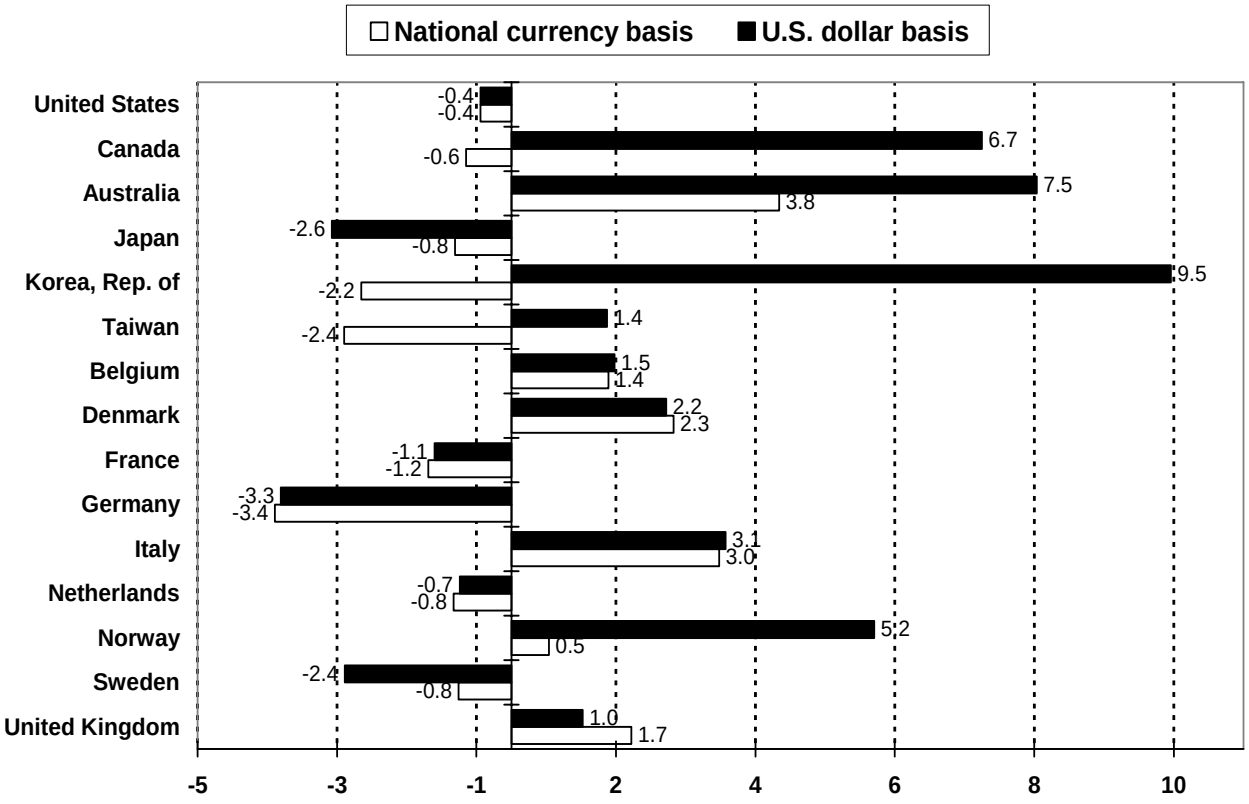


Table A. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 2004-2005

Percent change

Country or area	Output per Hour	Output	Total hours	Employ-ment	Average hours	Total compen-sation	Hourly compen-sation	Unit Labor Costs National currency	Unit Labor Costs U.S. dollars	Exchange rate(1)
United States	5.1	4.0	-1.1	-0.5	-0.6	3.5	4.6	-0.4	-0.4	--
Canada	5.7	2.2	-3.4	-2.2	-1.3	1.5	5.1	-0.6	6.7	7.4
Australia	1.9	-0.1	-1.9	-1.7	-0.3	3.8	5.8	3.8	7.5	3.6
Japan	2.4	1.1	-1.3	-0.7	-0.6	0.3	1.6	-0.8	-2.6	-1.8
Korea, Republic of	8.5	7.0	-1.4	-0.8	-0.6	4.7	6.2	-2.2	9.5	11.9
Taiwan	6.4	5.8	-0.6	0.4	-1.0	3.2	3.8	-2.4	1.4	3.9
Belgium	2.8	-0.4	-3.2	-1.6	-1.6	0.9	4.3	1.4	1.5	0.1
Denmark	0.0	0.0	0.0	-1.5	1.5	2.3	2.3	2.3	2.2	-0.1
France	3.9	1.5	-2.4	-2.3	0.0	0.3	2.7	-1.2	-1.1	0.1
Germany	5.3	3.0	-2.2	-1.7	-0.5	-0.5	1.8	-3.4	-3.3	0.1
Italy	0.1	-2.1	-2.2	-1.4	-0.8	0.8	3.0	3.0	3.1	0.1
Netherlands	4.1	0.2	-3.8	-2.3	-1.5	-0.6	3.3	-0.8	-0.7	0.1
Norway	2.8	2.6	-0.3	-0.8	0.5	3.1	3.4	0.5	5.2	4.6
Sweden	4.8	2.6	-2.2	-2.5	0.3	1.8	4.0	-0.8	-2.4	-1.6
United Kingdom	2.5	-1.1	-3.5	-3.4	-0.1	0.6	4.3	1.7	1.0	-0.7

(1) Value of foreign currency relative to the U.S. dollar.

Additional data available

Annual indexes of these variables also are estimated for the time period 1950-2005 and are available at the Bureau of Labor Statistics, Division of Foreign Labor Statistics website at http://www.bls.gov/fls/home.htm. However, for analytical purposes, the international comparisons in this release go back to 1979.

For further information, contact the Office of Productivity and Technology by phone at 202-691-5654, by e-mail at flspr@bls.gov, or by mail at Bureau of Labor Statistics, 2 Massachusetts Avenue, NE, Room 2150, Washington, DC 20212.

Manufacturing productivity, output, and labor input

The U.S. manufacturing productivity increase of 5.1 percent was fifth greatest among the 15 economies compared, behind Korea, Taiwan, Canada, and Germany. Italy, which along with Denmark has shown the lowest productivity growth over the last five years, was also the only economy comparable to Denmark in its virtual lack of productivity growth in 2005. (See tables A and B.)

Korea and Taiwan continued to be among the leaders in the growth of manufacturing output, as they have been for the last decade. Sweden, also a leader in manufacturing output growth over the decade, had more modest output growth in 2005. U.S. manufacturing output growth, like that of most of the economies, also slowed in 2005.

Decline in total hours worked, the other factor responsible for productivity growth, was also strongly evident in 2005. While 10 of the economies had increases in output, 14 had reductions in hours. The Netherlands had the greatest decline in hours in 2005, followed closely by the United Kingdom, Canada, and Belgium.

For most countries, the pace of decline in hours worked accelerated from 1995-2000 to 2000-2005. The United States and the United Kingdom experienced the most rapid declines.

Manufacturing employment and hours worked tend to move together, and, as with hours, employment declined in 14 of the 15 economies in 2005. Only Taiwan experienced employment growth, which is consistent with its long-term trend.

Generally, 2005 was a year of decreases in average hours worked. Eleven of the fifteen economies experienced decreases in 2005 compared to only three in 2004. The U.S. decrease of 0.6 was below its trend over the 1979-2005 period, which is a 0.1 percent average annual increase.

Manufacturing hourly compensation and unit labor costs

Total labor compensation in U.S. manufacturing increased by 3.5 percent in 2005. This was notably higher than the annual rate of increase in recent years, but almost the same as the rate of increase over the 1979-2005 period. Of the 14 economies for which comparable data are available, the United States is the only one that did not have a considerably smaller increase in 2005 than its average for the entire period since 1979. (See tables A and B.)

Like total compensation, the increase in hourly compensation in U.S. manufacturing in 2005 was more than twice the increase in 2004, yet about the same as over the past decade. In 2005, the U.S. rate of increase was fourth highest among the economies compared. Among the economies with comparable data, Canada, the United States, and Belgium were the only ones without a rate of increase that was substantially less than the average for the 1979-2005 period.

The relatively large increase in U.S. manufacturing productivity in 2005 might be expected to translate into a similar relative decrease in manufacturing unit labor costs. Unit labor costs did fall, but only by 0.4 percent, as hourly compensation increased. Eight other countries, led by Germany, had greater declines in unit labor costs, expressed in national currency units.

In 2005, the U.S. dollar depreciated less against the major European currencies than it had over the past two years. Consequently, manufacturing unit labor costs did not uniformly rise on a dollar basis. In 2005, besides the United States, five countries had decreases in their unit labor costs on a dollar basis, all of which were greater than the U.S. decline. Germany was the leader among economies experiencing a fall in unit labor costs, followed by Japan and Sweden.

The influence of exchange rate changes was not entirely absent from the unit labor cost changes, however. The currencies of Korea, Canada, Norway, Taiwan, and Australia all appreciated against the dollar to more than a negligible degree. They all experienced increases in dollar-denominated unit labor costs as well.

Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2005

Average annual rates of change(1)

Country or area	1979-2005	1979-1990	1990-1995	1995-2000	2000-2005	2003-2004	2004-2005
Output per hour							
United States	4.1	2.8	3.7	5.7	5.8	r5.3	5.1
Canada	2.5	2.0	3.8	r2.9	2.1	r4.1	5.7
Australia	2.9	2.8	2.9	3.8	2.3	r-0.7	1.9
Japan	3.5	3.8	3.3	r3.5	3.2	r5.7	2.4
Korea, Republic of	NA	NA	r9.4	10.8	7.1	r11.5	8.5
Taiwan	5.6	r6.1	r4.7	r5.6	5.2	4.7	6.4
Belgium	3.5	4.2	3.2	2.7	3.0	3.2	2.8
Denmark	1.9	r2.2	2.7	1.8	0.4	0.9	0.0
France	4.3	4.2	4.6	r5.0	3.6	r3.6	3.9
Germany (2)	2.8	2.1	2.9	3.7	3.5	4.7	5.3
Italy	1.8	r2.9	r2.6	r0.9	-0.6	r0.9	0.1
Netherlands	3.4	3.5	3.5	r3.4	2.9	r5.0	4.1
Norway	2.0	2.0	0.5	1.1	4.4	r5.1	2.8
Sweden	4.7	2.5	5.8	7.2	5.9	9.8	4.8
United Kingdom	3.5	4.1	r2.8	2.6	3.7	5.6	2.5
Output							
United States	2.9	2.2	3.6	5.4	1.5	4.8	4.0
Canada	2.5	1.8	2.4	5.9	0.7	r4.6	2.2
Australia	1.5	1.6	0.8	r2.5	1.1	r-0.2	-0.1
Japan	2.4	4.7	0.4	r1.2	0.7	r4.6	1.1
Korea, Republic of	8.9	r10.7	r8.2	7.9	6.6	r11.1	7.0
Taiwan	5.8	r7.4	r4.4	r5.8	3.9	9.4	5.8
Belgium	1.8	2.6	0.6	2.6	0.3	2.3	-0.4
Denmark	0.9	r1.2	2.1	1.7	-1.8	r-2.6	0.0
France	2.1	2.0	1.7	3.9	1.2	r1.7	1.5
Germany (2)	1.1	1.2	-1.0	2.2	1.7	4.6	3.0
Italy	1.3	r2.6	r1.6	r0.7	-1.2	r0.8	-2.1
Netherlands	2.0	2.5	1.8	r3.3	0.1	r1.6	0.2
Norway	0.6	-0.4	1.1	1.0	1.9	r4.7	2.6
Sweden	3.6	1.8	3.8	7.4	3.9	9.9	2.6
United Kingdom	0.6	0.9	0.5	1.3	-0.6	r2.0	-1.1

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2005

Average annual rates of change(1)

Country or area	1979-2005	1979-1990	1990-1995	1995-2000	2000-2005	2003-2004	2004-2005
Total hours							
United States	-1.1	-0.6	-0.1	-0.2	-4.1	r-0.5	-1.1
Canada	0.0	-0.2	-1.3	r2.9	-1.3	r0.6	-3.4
Australia	-1.3	-1.2	-2.0	-1.2	-1.2	0.5	-1.9
Japan	-1.1	0.8	-2.8	r-2.2	-2.4	r-1.0	-1.3
Korea, Republic of	NA	NA	-1.1	-2.6	-0.5	r-0.4	-1.4
Taiwan	0.2	1.2	-0.3	0.1	-1.3	4.5	-0.6
Belgium	-1.7	-1.6	-2.5	-0.1	-2.5	-0.9	-3.2
Denmark	-1.0	r-1.0	-0.7	-0.1	-2.2	r-3.5	0.0
France	-2.1	-2.1	-2.8	-1.1	-2.3	r-1.8	-2.4
Germany (2)	-1.7	-0.9	-3.8	-1.4	-1.8	-0.1	-2.2
Italy	-0.4	-0.2	r-0.9	r-0.2	-0.6	r-0.2	-2.2
Netherlands	-1.3	-1.0	-1.7	r-0.1	-2.7	r-3.2	-3.8
Norway	-1.4	-2.3	0.6	-0.1	-2.4	-0.3	-0.3
Sweden	-1.0	-0.7	-1.9	0.3	-1.9	0.0	-2.2
United Kingdom	-2.8	-3.1	r-2.3	-1.3	-4.1	r-3.4	-3.5
Employment							
United States	-1.2	-0.8	-0.5	-0.1	-3.7	r-1.3	-0.5
Canada	-0.1	-0.2	-1.5	r2.5	-1.1	r-1.3	-2.2
Australia	-1.4	-1.3	-2.3	-1.1	-1.1	0.6	-1.7
Japan	-0.8	1.0	-1.6	r-2.0	-2.5	r-2.1	-0.7
Korea, Republic of	NA	NA	-0.8	-2.5	0.5	r0.8	-0.8
Taiwan	0.8	2.0	-0.3	0.4	-0.3	3.2	0.4
Belgium	-1.6	-1.6	-2.2	-0.6	-1.9	-2.4	-1.6
Denmark	-1.1	r-0.4	-1.2	-1.2	-2.2	r-2.7	-1.5
France	-1.6	-1.6	-2.5	-0.3	-1.8	r-3.1	-2.3
Germany (2)	-1.3	-0.1	-4.2	-0.8	-1.5	-1.5	-1.7
Italy	-0.8	-0.9	r-1.8	r-0.2	-0.2	r-1.1	-1.4
Netherlands	-1.1	-0.8	-1.6	r0.1	-2.6	r-4.2	-2.3
Norway	-1.3	-2.2	0.3	0.1	-2.6	-2.9	-0.8
Sweden	-1.4	-1.0	-3.5	0.0	-1.7	-1.9	-2.5
United Kingdom	-2.8	-2.9	-2.6	r-1.4	-4.2	r-4.1	-3.4

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2005

Average annual rates of change(1)

Country or area	1979-2005	1979-1990	1990-1995	1995-2000	2000-2005	2003-2004	2004-2005
Average hours							
United States	0.1	0.2	0.4	-0.2	-0.3	0.8	-0.6
Canada	0.1	0.0	0.3	r0.4	-0.2	r1.9	-1.3
Australia	0.1	0.1	0.3	-0.1	-0.1	-0.1	-0.3
Japan	-0.3	-0.2	-1.3	r-0.2	0.1	1.1	-0.6
Korea, Republic of	NA	NA	-0.2	-0.1	-1.0	r-1.2	-0.6
Taiwan	-0.6	-0.8	0.0	-0.3	-1.0	1.3	-1.0
Belgium	-0.1	0.0	-0.3	0.5	-0.6	1.6	-1.6
Denmark	0.1	r-0.5	0.6	1.1	0.0	r-0.7	1.5
France	-0.5	-0.5	-0.3	-0.8	-0.5	r1.3	0.0
Germany (2)	-0.5	-0.9	0.4	-0.6	-0.3	1.5	-0.5
Italy	0.4	0.6	0.9	0.0	-0.3	0.9	-0.8
Netherlands	-0.2	-0.2	0.0	-0.2	-0.2	r1.0	-1.5
Norway	0.0	-0.1	0.3	-0.2	0.2	2.7	0.5
Sweden	0.5	0.3	1.7	0.2	-0.2	1.9	0.3
United Kingdom	0.0	-0.2	r0.3	0.1	0.1	r0.7	-0.1
Total labor compensation(3): National currency basis							
United States	3.6	4.9	3.4	4.4	0.4	r1.5	3.5
Canada	4.5	6.5	2.4	5.2	1.7	r1.4	1.5
Australia	NA	NA	3.4	3.0	3.8	2.5	3.8
Japan	1.8	5.5	0.7	r-1.0	-2.1	r-0.6	0.3
Korea, Republic of	13.9	19.6	17.6	5.4	7.2	r13.8	4.7
Taiwan	7.5	13.5	6.8	3.6	-0.3	r2.1	3.2
Belgium	2.7	4.4	1.3	1.9	1.0	0.7	0.9
Denmark	4.2	r7.0	2.3	2.8	1.4	r-0.6	2.3
France	3.8	r7.3	r1.7	r1.7	0.8	r0.5	0.3
Germany (2)	2.7	4.6	2.4	1.6	0.2	0.5	-0.5
Italy	6.5	11.4	r4.1	r2.6	2.5	r3.0	0.8
Netherlands	2.8	3.1	2.8	3.4	1.3	r0.1	-0.6
Norway	4.8	6.5	4.0	5.0	1.8	2.3	3.1
Sweden	5.4	8.4	2.0	5.3	2.3	2.2	1.8
United Kingdom	4.0	7.1	r1.3	3.4	0.4	r1.2	0.6

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2005

Average annual rates of change(1)

Country or area	1979-2005	1979-1990	1990-1995	1995-2000	2000-2005	2003-2004	2004-2005
Hourly compensation(3): National currency basis							
United States	4.8	5.5	3.5	4.7	4.6	r2.0	4.6
Canada	4.6	6.8	3.8	r2.2	3.1	r0.8	5.1
Australia	NA	NA	5.5	4.3	5.0	2.0	5.8
Japan	2.9	4.6	3.6	r1.2	0.4	0.5	1.6
Korea, Republic of	NA	NA	18.9	8.1	7.7	r14.2	6.2
Taiwan	7.2	12.1	7.1	3.4	1.0	r-2.3	3.8
Belgium	4.4	6.1	3.9	2.1	3.7	1.6	4.3
Denmark	5.2	r8.1	2.9	2.9	3.7	r2.9	2.3
France	6.1	r9.6	r4.6	r2.8	3.2	r2.3	2.7
Germany (2)	4.5	5.6	6.4	3.1	2.0	0.5	1.8
Italy	7.0	11.7	r5.0	2.8	3.1	r3.2	3.0
Netherlands	4.1	4.1	4.5	r3.5	4.2	r3.5	3.3
Norway	6.3	9.0	3.4	5.2	4.3	2.6	3.4
Sweden	6.4	9.1	4.0	5.1	4.3	2.1	4.0
United Kingdom	7.0	10.6	r3.7	r4.8	4.7	r4.7	4.3
Unit labor costs(3): National currency basis							
United States	0.7	2.7	-0.2	-0.9	-1.1	r-3.2	-0.4
Canada	2.0	4.7	0.0	r-0.7	1.0	r-3.1	-0.6
Australia	NA	NA	2.5	r0.5	2.7	r2.7	3.8
Japan	-0.6	0.8	0.3	r-2.2	-2.7	r-5.0	-0.8
Korea, Republic of	4.6	r8.1	r8.7	-2.4	0.5	r2.4	-2.2
Taiwan	1.6	r5.6	r2.3	r-2.1	-4.0	r-6.7	-2.4
Belgium	0.9	1.8	0.7	-0.6	0.7	-1.6	1.4
Denmark	3.3	5.7	0.2	1.1	3.3	r2.0	2.3
France	1.7	r5.2	r0.0	r-2.1	-0.4	r-1.2	-1.2
Germany (2)	1.7	3.3	3.4	-0.5	-1.5	-4.0	-3.4
Italy	5.1	r8.5	r2.4	r1.9	3.7	r2.3	3.0
Netherlands	0.7	0.6	1.0	r0.1	1.2	r-1.5	-0.8
Norway	4.2	6.9	2.9	4.0	-0.1	r-2.3	0.5
Sweden	1.7	6.5	-1.7	-1.9	-1.5	-7.0	-0.8
United Kingdom	3.3	6.2	r0.8	r2.1	1.0	r-0.8	1.7

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2005

Average annual rates of change(1)

Country or area	1979-2005	1979-1990	1990-1995	1995-2000	2000-2005	2003-2004	2004-2005
Unit labor costs(3): U.S. dollar basis							
United States	0.7	2.7	-0.2	-0.9	-1.1	r-3.2	-0.4
Canada	1.9	4.7	-3.2	-2.2	5.2	r4.3	6.7
Australia	NA	NA	r1.5	-4.3	8.4	r16.0	7.5
Japan	2.1	4.6	9.4	r-4.9	-3.2	r1.9	-2.6
Korea, Republic of	1.6	r4.4	r6.9	-9.5	2.5	r6.6	9.5
Taiwan	2.0	r8.5	r2.7	r-5.3	-4.5	r-3.8	1.4
Belgium	0.5	0.6	3.3	-8.1	6.9	8.1	1.5
Denmark	2.8	r4.2	2.2	-6.1	9.7	r12.0	2.2
France	0.8	r2.9	r1.8	r-8.8	5.8	r8.6	-1.1
Germany (2)	2.3	4.5	5.9	-8.0	4.6	5.5	-3.3
Italy	2.6	r5.0	r-3.7	r-3.1	10.1	r12.4	3.1
Netherlands	1.2	1.5	3.6	r-7.6	7.5	8.3	-0.7
Norway	3.2	4.9	2.6	-2.7	6.3	r2.6	5.2
Sweden	-0.5	3.4	-5.3	-6.7	2.7	2.2	-2.4
United Kingdom	2.7	4.5	r-1.6	r1.3	4.7	r11.2	1.0
Exchange rates(4)							
United States	--	--	--	--	--	--	--
Canada	-0.1	0.0	-3.2	-1.6	4.2	7.6	7.4
Australia	-1.5	-3.2	-1.1	-4.7	5.6	12.9	3.6
Japan	2.7	3.8	9.1	-2.7	-0.4	7.2	-1.8
Korea, Republic of	-2.8	-3.4	-1.7	-7.3	2.0	4.1	11.9
Taiwan	0.4	2.7	0.3	-3.3	-0.5	3.1	3.9
Belgium	-0.4	-1.2	2.5	-7.6	6.2	9.9	0.1
Denmark	-0.5	-1.5	2.0	-7.1	6.2	9.8	-0.1
France	-0.8	-2.2	1.8	-6.8	6.2	9.9	0.1
Germany (2)	0.6	1.1	2.5	-7.5	6.2	9.9	0.1
Italy	-2.4	-3.3	-6.0	-4.9	6.2	9.9	0.1
Netherlands	0.5	0.9	2.6	-7.6	6.2	9.9	0.1
Norway	-0.9	-1.9	-0.3	-6.4	6.5	5.1	4.6
Sweden	-2.1	-2.9	-3.7	-4.9	4.2	9.9	-1.6
United Kingdom	-0.6	-1.6	-2.4	-0.8	3.7	12.1	-0.7

r=revised NA=data not available
(1) Rates of change based on the compound rate method.
(2) Data for years before 1991 pertain to the former West Germany.
(3) Adjusted for employment taxes and government subsidies to estimate the actual cost to employers.
(4) Value of foreign currency relative to the U.S. dollar.

Trade-weighted unit labor costs

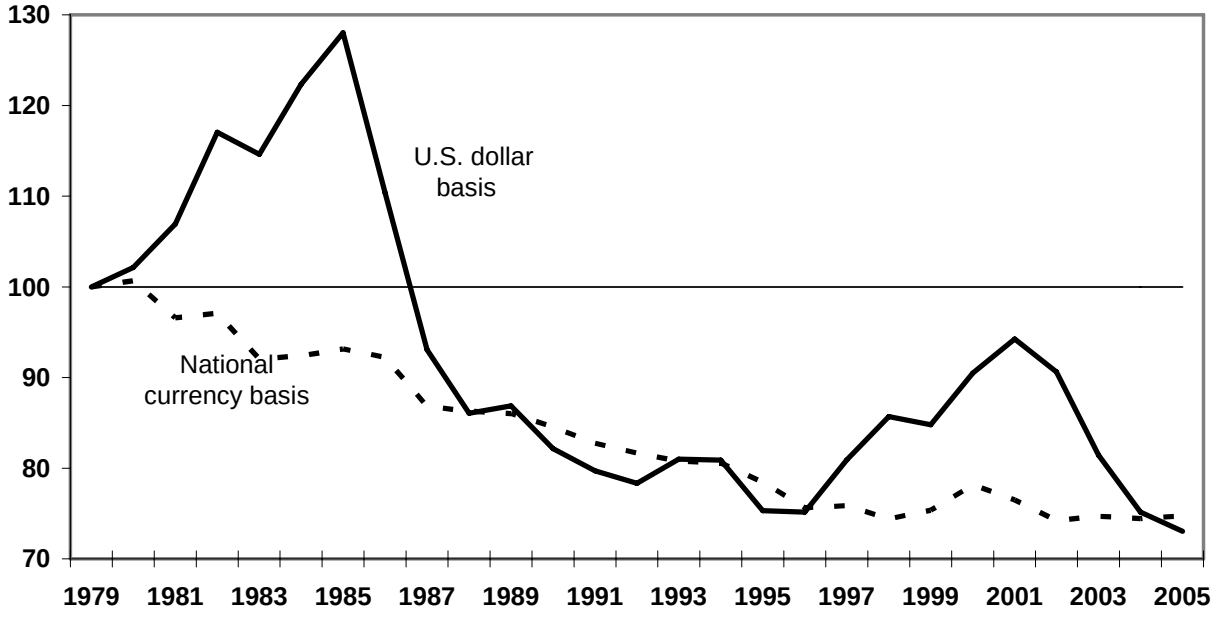
BLS constructs indexes of U.S. unit labor cost trends relative to a trade-weighted average of unit labor cost trends in the other economies to take account of differences in the relative importance of foreign economies to U.S. trade in manufactured goods. Relative trade-weighted unit labor cost indexes are calculated on both a national currency and a U.S. dollar basis.

In this release, the relative U.S. trade-weighted indexes are estimated against 13 economies for which comparable data are available over the period of comparison; the indexes underlying this chart are shown in table C.

Chart 3 begins in 1979, a year in which U.S. manufacturing output reached a business cycle peak.

Chart 3. U.S. manufacturing unit labor costs relative to 13[(1)] competitors, 1979-2005

(1979 = 100)



(1) Australia has been omitted from this chart because data for 1979 are not available.

In the chart, the solid line indicates that U.S. unit labor costs rose faster than the costs of “competitors” from 1979 to 1985 on a U.S. dollar basis. In most years from 1986 to 1996, U.S. costs either rose at a slower rate than the "competitors" costs or fell at a faster rate. From 1997, however, the strength of the U.S. dollar caused relative U.S. unit labor costs to rise. After a dip in 1999, the index of relative U.S. unit labor costs rose in 2000 and 2001, only to decline again after 2001 with the weakening of the U.S. dollar.

Table C. U.S. manufacturing unit labor costs relative to 13(1) competitors, 1979-2005

Year	Unit Labor Costs National Currency Basis			Unit Labor Costs U.S. Dollar Basis		
	Own Index	Competitors' Index	Ratio	Own Index	Competitors' Index	Ratio
1979	100.0	100.0	100.0	100.0	100.0	100.0
1980	112.7	112.0	100.7	112.7	110.4	102.1
1981	117.6	121.8	96.6	117.6	110.0	106.9
1982	127.4	131.2	97.1	127.4	108.9	117.0
1983	122.7	133.3	92.1	122.7	107.0	114.6
1984	123.8	134.0	92.4	123.8	101.2	122.3
1985	126.2	135.5	93.1	126.2	98.6	128.0
1986	130.1	141.0	92.2	130.1	117.8	110.4
1987	125.4	144.4	86.8	125.4	134.8	93.1
1988	126.5	146.6	86.3	126.5	147.0	86.1
1989	129.4	150.5	86.0	129.4	149.0	86.9
1990	133.4	157.7	84.6	133.4	162.4	82.1
1991	136.8	165.3	82.7	136.8	171.6	79.7
1992	137.8	168.8	81.7	137.8	176.0	78.3
1993	136.9	169.4	80.8	136.9	169.0	81.0
1994	134.2	166.6	80.6	134.2	165.9	80.9
1995	131.9	168.1	78.5	131.9	175.1	75.3
1996	129.0	170.6	75.6	129.0	171.7	75.2
1997	127.1	167.6	75.9	127.1	157.2	80.9
1998	125.7	169.0	74.4	125.7	146.7	85.7
1999	124.4	165.1	75.4	124.4	146.8	84.8
2000	125.8	160.9	78.2	125.8	139.0	90.5
2001	127.4	166.5	76.5	127.4	135.2	94.2
2002	123.5	166.4	74.2	123.5	136.3	90.6
2003	123.4	165.2	74.7	123.4	151.5	81.4
2004	119.5	160.5	74.4	119.5	158.9	75.2
2005	118.9	159.2	74.7	118.9	162.8	73.0

(1) Australia has been omitted from this table because data for 1979 are not available.

Technical Notes

The comparisons in this release are based on data available to the Bureau of Labor Statistics as of mid-August 2006 from the national statistical agencies of the 15 economies compared.

Definitions. Labor productivity is defined as real output per hour worked. Although the labor productivity measure presented in this release relates output to the hours worked 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, capacity utilization, energy use, and managerial skills, as well as the skills and efforts of the workforce.

Unit labor costs are defined as the cost of labor input required to produce one unit of output. They are computed as compensation in nominal terms divided by real output. Unit labor costs can also be computed by dividing hourly compensation by output per hour, that is, by labor productivity.

Methodology . BLS constructs trends of manufacturing labor productivity, hourly compensation costs, and unit labor costs from three basic aggregate measures: output, total labor hours, and total compensation. The hours and compensation measures refer to employees (wage and salary earners) in Belgium and Taiwan. For all other economies, the measures refer to all employed persons, including employees, self-employed persons, and unpaid family workers.

In general, the measures relate to total manufacturing as defined by the International Standard Industrial Classification (ISIC). However, the measures for France include parts of mining. Data for the United States are in accordance with the North American Industry Classification System (NAICS 97), except compensation data before 1987. Canadian output, employment, and hours data are in accordance with NAICS 97 beginning in 1997 while compensation data are also in accordance with NAICS 1997 starting in 1961.

The data for the most recent years are based on the United Nations System of National Accounts 1993 (SNA 93) or its sub-system, the European System of Integrated National Accounts (ESA 95). For earlier years, data were compiled according to previously used systems.

To obtain historical time series, BLS may link together data series which were compiled according to different accounting systems by national statistical agencies.

Output. For most economies, the output measures are real value added in manufacturing from national accounts. However, output for Japan prior to 1970 and for the Netherlands prior to 1960 are indexes of industrial production. The manufacturing value added measures for the United Kingdom are essentially identical to their indexes of industrial production.

Most economies now estimate manufacturing real output using moving price weights, as recommended by SNA 93. However, many earlier time periods within the historical real output series have been estimated using fixed price weights, with the weights updated periodically (for example, every 5 or 10 years). Taiwan and Korea still use fixed price weights to estimate real output.

Measures of real output also may differ among economies because of different approaches to estimating the prices of high-technology products like computers and, in general, of products that undergo rapid quality change.

For the United States, the output measure for the manufacturing sector is a chain-weighted index of real gross product originating (deflated value added) produced by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. For more information on the U.S. measure, see "Improved Estimates of Gross Product by Industry for 1947-98," *Survey of Current Business*, June 2000, pp. 24-38 and "Gross Domestic Product by Industry for 1947-86. New Estimates Based on the North American Industry Classification System," *Survey of Current Business*, December 2005, pp. 70-84.

The U.S. output series used for international comparisons differs from the manufacturing output series that BLS publishes as part of its major sector productivity and costs measures for the United States. The international comparisons program uses a value added output concept, while the major sector series is on a sectoral output basis. Sectoral output is gross output less intrasector sales and transfers. The U.S. major sector productivity and costs measures can be found at http://www.bls.gov/lpc/home.htm. For information on sectoral output, see "Measurement of productivity growth in U.S. manufacturing," *Monthly Labor Review*, July 1995, pp. 13-28.

Value added measures have been used for the international comparisons series because the data are more readily available from the economies' national accounts, whereas sectoral output would require a complex estimation procedure. Even though BLS has determined that sectoral output is the correct concept for U.S. measures of productivity, there are other considerations that may make value added a better concept for international comparisons of labor productivity, such as differences among economies in the extent of vertical integration of industries.

Labor Input. For all of the economies for the most recent years, the term "hours" refers to hours worked. For some earlier years, BLS uses other hours measures.

For the United States, the employment and hours data series beginning with 1987 are taken from the NAICS-based manufacturing all-employed series published by BLS as part of the major sector productivity and cost measures. For the period before 1987, these series are linked to NAICS-based, employees-only data from the Current Employment Statistics (CES) program.

For France (from 1970 forward), Canada, Denmark, Norway, and Sweden, the aggregate hours worked series used are series published with the national accounts. For the former

West Germany after 1959 and Germany from 1991, BLS uses a measure of aggregate hours worked that was developed by a research institute of the German Ministry of Labor for use with the national accounts employment figures. The Italian hours worked series is based on estimates by the Bank of Italy. For the United Kingdom from 1991, an annual index of total manufacturing hours worked is used.

For all other economies, the U.K. before 1992, and the former West Germany before 1959, BLS constructs its own estimates of aggregate hours, using employment figures published with the national accounts, or other comprehensive employment series, and estimates of average annual hours worked.

Compensation (Labor Cost). The compensation measures are from national accounts data and are in nominal terms. Compensation includes employer expenditures for legally required insurance programs and contractual and private benefit plans, in addition to all payments made in cash or in kind directly to employees. When data for the self-employed are not available, total compensation is estimated by assuming the same average compensation for the self-employed as for employees.

Labor cost is defined as compensation plus employment taxes minus employment subsidies, i.e. the cost to employers of hiring labor. For most economies, labor cost is the same as compensation. However, for Australia, Canada, France, and Sweden, compensation is increased to account for important taxes on payroll or employment. For the United Kingdom, compensation is reduced between 1967 and 1991 to account for subsidies.

Data for Germany. German data prior to 1991 pertain to the former West Germany. The data series are linked in 1991.

Data for Australia. Australian data are published by fiscal years, which run from July 1 through June 30. The Australian Bureau of Statistics provides unpublished calendar-year data for real value added, employment, and hours worked. For compensation, BLS estimates calendar-year series using two-year moving averages of the data for fiscal years. Manufacturing compensation data are not available for years prior to 1990.

Data for Recent Years. The measures for recent years may be based on current indicators of output (such as industrial production indexes), employment, average hours, and hourly compensation until national accounts and other statistics, normally used for the long-term measures, become available.

Trade-Weighted Measures. The trade weights used to calculate the relative unit labor cost indexes of the United States and the other economies are based on the relative dollar value of U.S. trade in manufactured commodities (exports plus imports) with each economy in 2004. The trade data are compiled by the U.S. Census Bureau.

The following weights were used for the entire period for which trade-weighted unit labor cost measures are produced:

	Weight		*Weight*
Canada	36.50	Germany	10.25
Japan	17.10	Italy	3.65
Korea	6.82	Netherlands	3.31
Taiwan	5.30	Norway	0.41
Belgium	2.75	Sweden	1.51
Denmark	0.55	United Kingdom	7.00
France	4.85		

Level Comparisons. The BLS measures are limited to trend comparisons. BLS does not prepare level comparisons of manufacturing productivity and unit labor costs because of data limitations and technical problems in comparing the levels of manufacturing output among economies. Each economy measures manufacturing output in its own currency units. To compare outputs among economies, a common unit of measure is needed. Market exchange rates are not suitable as a basis for comparing output levels. What is needed are purchasing power parities, which are the number of foreign currency units required to buy goods and services equivalent to what can be bought with one unit of U.S. currency.

Purchasing power parities are available for total gross domestic product (GDP) from the Organization for Economic Cooperation and Development (OECD). However, these parities are derived for expenditures made by consumers, business, and government for goods and services - not for value added by industry. Therefore, they do not provide purchasing power parities by industry. The parities developed for total GDP are not suitable for each component industry, such as manufacturing.

European exchange rates. On Jan. 1, 1999, 11 European countries joined the European Monetary Union (EMU). Greece joined on Jan. 1, 2001. The euro, the official currency of the EMU, was established at fixed conversion rates to the previous national currencies of EMU members. Data on manufacturing value added and labor compensation for euro-area countries are now reported in euros.

In order to maintain historical continuity of data series, data for euro-area countries for years before 1999 have been converted to euros by applying the fixed euro/national currency conversion rates. For countries and years where output, compensation, and exchange rates are converted from national currency units into euros, the following fixed conversion rates are used:

1 euro equals:	40.3399	Belgian francs	1936.27	Italian lire
	6.55957	French francs	2.20371	Netherlands guilders
	1.95583	German marks		

The currency exchange rates cited in this publication are annual averages of daily buying rates in New York City.