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United States Department of Labor
Bureau of Labor Statistics Washington, D.C. 20212

Internet address: http://www.bls.gov
Technical information: (202) 691-5654
Media contact: (202) 691-5902

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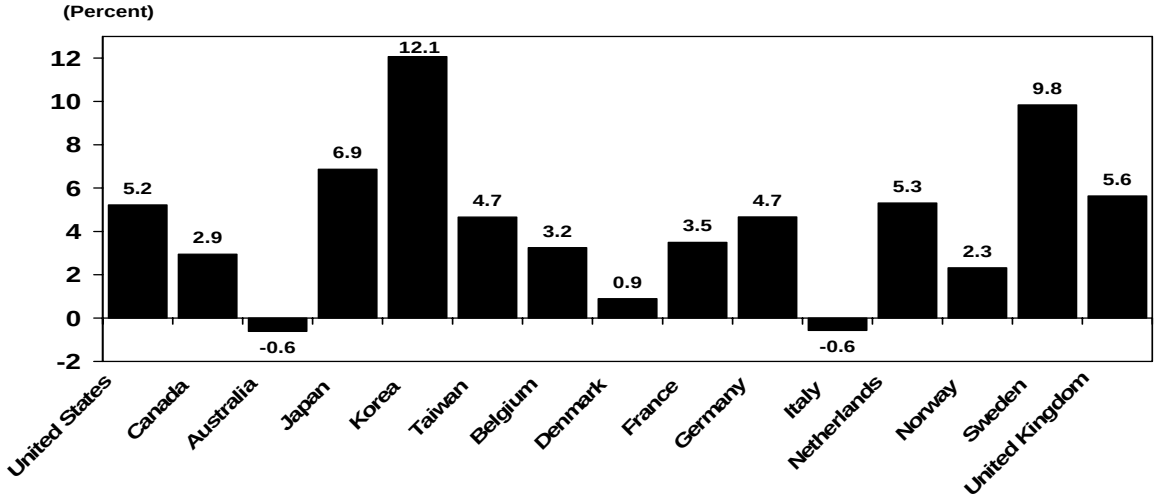
INTERNATIONAL COMPARISONS OF MANUFACTURING PRODUCTIVITY AND UNIT LABOR COST TRENDS, REVISED DATA FOR 2004

Manufacturing labor productivity increased in 13 of 15 economies in 2004, according to the U.S. Department of Labor's Bureau of Labor Statistics. The U.S. increase of 5.2 percent was the sixth highest. Korea and Sweden had the largest productivity increases (12.1 and 9.8 percent respectively). The U.S. productivity increase is a revision from the preliminary estimate of 4.7 percent released in October 2005. Australia and Italy were the only two economies showing declines in manufacturing productivity in 2004.

The 2004 growth rate in U.S. manufacturing productivity was less than the increase in 2003, but above the average annual growth rate since 1979. Seven of the other 13 economies for which comparisons are available also had productivity growth in 2004 that exceeded their annual average increases over the 1979–2004 period. (Average annual growth rates for selected measures over various time periods are found in tables A and B.)

Chart 1. Percent change in manufacturing output per hour, 2003-2004



Manufacturing unit labor costs declined in the United States in 2004 (-2.9 percent), as they did in ten other economies, when expressed in national currency units. The steepest declines were in Sweden (-7.0 percent) and Japan (-6.0 percent). Among the four countries where unit labor costs increased, the largest increases occurred in Denmark and Italy (3.4 and 3.2 percent respectively).

In 2004, the dollar declined in value against the currencies of all the other economies in this comparison, although generally less than in 2003. The decline was particularly large against the Australian dollar and the British pound. As a result of the dollar's devaluation, besides the United States, only Taiwan showed a decrease in dollar-denominated unit labor costs. (See chart 2 and table A.)

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

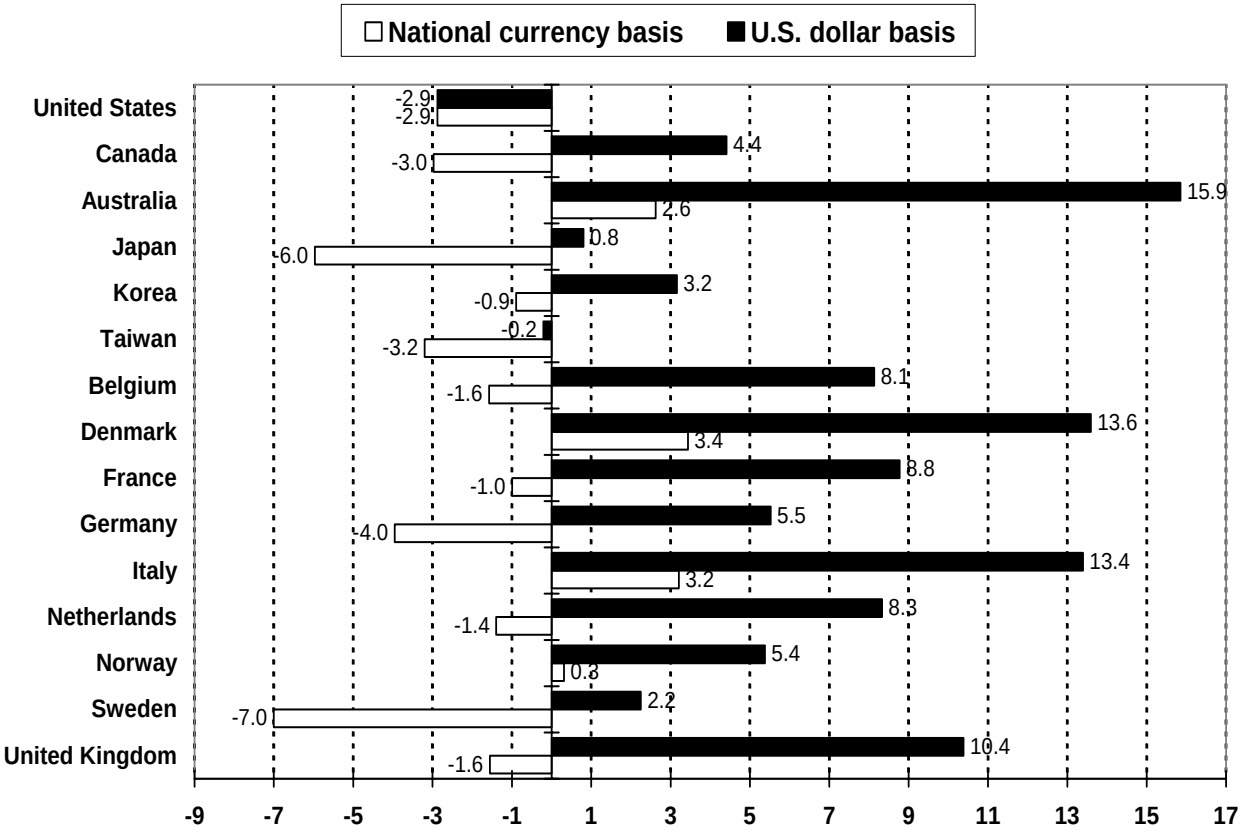


Table A. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 2003-2004

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	5.2	4.8	-0.4	-1.2	0.8	1.8	2.2	-2.9	-2.9	--
Canada	2.9	3.8	0.8	-1.0	1.8	0.7	-0.1	-3.0	4.4	7.6
Australia	-0.6	-0.1	0.5	0.6	-0.1	2.5	2.0	2.6	15.9	12.9
Japan	6.9	5.5	-1.3	-2.4	1.1	-0.8	0.5	-6.0	0.8	7.2
Korea	12.1	11.4	-0.6	0.5	-1.1	10.4	11.1	-0.9	3.2	4.1
Taiwan	4.7	9.4	4.5	3.2	1.3	5.9	1.3	-3.2	-0.2	3.1
Belgium	3.2	2.3	-0.9	-2.4	1.6	0.7	1.6	-1.6	8.1	9.9
Denmark	0.9	-2.8	-3.6	-3.0	-0.6	0.6	4.4	3.4	13.6	9.8
France	3.5	1.0	-2.4	-2.4	0.0	0.0	2.5	-1.0	8.8	9.9
Germany	4.7	4.6	-0.1	-1.5	1.5	0.5	0.5	-4.0	5.5	9.9
Italy	-0.6	0.0	0.5	-0.3	0.9	3.2	2.6	3.2	13.4	9.9
Netherlands	5.3	1.2	-3.9	-4.0	0.1	-0.2	3.8	-1.4	8.3	9.9
Norway	2.3	2.0	-0.3	-2.9	2.7	2.3	2.6	0.3	5.4	5.1
Sweden	9.8	9.9	0.0	-1.9	1.9	2.2	2.1	-7.0	2.2	9.9
United Kingdom	5.6	1.9	-3.5	-3.7	0.1	0.3	4.0	-1.6	10.4	12.1

(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 1950-2004 and are available at the Bureau of Labor Statistics, Division of Foreign Labor Statistics website at address 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.

Notes about the measures

The measures in this release are based on data available to BLS as of mid-January 2006. Revisions for 2004 and earlier years were made for several economies to incorporate data not available at the time of the October 2005 report.

United States

The U.S. output series in this release is a value-added measure produced by the Bureau of Economic Analysis (BEA) as part of the integrated annual GDP-by-industry and input-output (I-O) accounts. The latest data were released in December 2005 and begin with 1947. The data are based on the 1997 North American Industry Classification System (NAICS). Additional details are available in Robert E. Yuskavage and Mahnaz Fahim-Nader, "Gross Domestic Product by Industry for 1947–86. New Estimates Based on the North American Industry Classification System," *Survey of Current Business*, December 2005.

From 1987, the employment and hours data series 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 United States. For the period before 1987, these series are linked to NAICS-based, manufacturing employees-only data from the Current Employment Statistics (CES) program.

In previous releases, U.S. manufacturing output data were not available for years prior to 1977, and output and labor input data for years prior to 1987 were based on the Standard Industrial Classification (SIC). The change in classification from SIC to NAICS has resulted in revised output and productivity growth estimates.

Manufacturing productivity, output, and labor input

United States manufacturing productivity increased 5.2 percent in 2004, the sixth largest increase among 15 economies compared. Korea and Sweden had the largest productivity increases (12.1 and 9.8 percent respectively). Italy and Australia were the only two countries showing declines in manufacturing productivity in 2004.

The U.S. productivity increase is a revision from the preliminary estimate of 4.7 percent released in October 2005. Although below the strong showing in 2003 (+7.1 percent), the 5.2 percent gain is in line with the average annual U.S. productivity growth rates recorded since 1990. Since 1990, the average annual U.S. productivity increases have been in the top third of the 15 economies compared. (See tables A and B.)

For most countries, the increases in labor productivity in 2004 were a combination of greater manufacturing output and fewer aggregate hours worked. In Canada, Taiwan, and Sweden hours worked increased less then output or stayed the same. Manufacturing hours worked also increased in Australia and Italy, while output declined or remained unchanged, resulting in declines in labor productivity in those two countries.

In 2004, there was an acceleration in manufacturing output and a slowing of the declines in manufacturing employment and aggregate hours worked in most of the compared economies. Average hours worked tended to increase. Korea, Sweden, and Taiwan showed the highest manufacturing output growth rates. U.S. output increased at a revised 4.8 percent in 2004, up from a preliminary estimate of 4.3 percent, and was the fifth fastest among the 15 economies.

In 2004, manufacturing output declined in only two countries (Australia and Denmark), while output had declined in five countries in 2003. For most economies, the 2004 increases in output were also above the corresponding average annual increases for the period after 2000.

Hours worked in U.S. manufacturing declined -0.4 percent in 2004, less than the decline recorded in 2003 (-4.9 percent) or the average annual declines in the period after 2000 (-4.8 percent). Total manufacturing hours worked also fell in nine other countries, the largest decline occurring in the Netherlands (-3.9 percent). However, there was a tendency toward smaller declines in hours worked, or to changes from declines to increases, in 2004 compared to 2003. (See tables A and B.)

Trends and changes in manufacturing employment and hours worked tend to move together. U.S. manufacturing employment fell -1.2 percent in 2004, one-fourth the decline in 2003. Manufacturing employment also fell in most other economies in 2004, increasing in only three: Taiwan, Australia, and Korea. The biggest decline was in the Netherlands (-4.0 percent) and the smallest in Italy (-0.3 percent). However, for most countries, the declines in employment in 2004 were smaller than in 2003.

Average hours worked in U.S. manufacturing increased +0.8 percent in 2004, following a decline of -0.1 percent in 2003. Average hours worked also increased in

most of the other 14 economies, declining in only three: Australia, Korea, and Denmark. This is in contrast to 2003, when average hours worked declined in 11 countries. This also presents a contrast to the entire period after 2000, during which average hours declined in 9 of the 15 economies.

Manufacturing hourly compensation and unit labor costs

Total labor compensation in U.S. manufacturing increased 1.8 percent in 2004, about half the 3.0 percent increase recorded in 2003. Total labor compensation also grew in most other economies, with Korea (+10.4 percent) and Taiwan (+5.9 percent) showing the largest increases. Aggregate manufacturing compensation declined in Japan and in the Netherlands.

The rate of growth in U.S. compensation in 2004 was near the middle of the economies compared. It was above the average annual change in U.S. compensation for the period following 2000 (no change), but below the average annual increases since 1979. Compared to the same post-1979 period, all the other 13 economies for which comparable data are available also recorded slower 2004 increases, or even declines, in labor compensation. (See tables A and B.)

Hourly compensation in manufacturing increased in 2004 in all the economies except Canada, where hourly compensation declined -0.1 percent. The 2.2 percent increase in U.S. hourly compensation was in the middle of the results for the other economies. Korea reported the largest increase (11.1 percent). All the other increases were less than 5 percent.

For most economies, the 2004 hourly compensation increases were smaller than the increases in 2003. This continues a tendency for the rate of growth in hourly compensation in manufacturing to decline in most of the compared economies over the period since 1979.

Manufacturing unit labor costs declined in the United States in 2004 (-2.9 percent), as they did in most other economies, when expressed in national currency units. The steepest declines were in Sweden (-7.0 percent) and Japan (-6.0 percent). Among the four countries where unit labor costs increased, the largest increases occurred in Denmark and Italy (3.4 and 3.2 percent respectively).

The 2004 decline in U.S. unit labor costs represents a turn-around from the 1.1 percent increase recorded in 2003, and resumes the average annual reductions in unit labor costs that have prevailed during the period following 1990.

In most economies, unit labor costs declined in 2004 as productivity increased more than hourly compensation. However, unit labor costs increased in Denmark and Norway, where hourly compensation increased more than productivity, and in Australia and Italy, where productivity fell.

Exchange rate movements are often the dominant influence on the relative changes in the unit labor costs of different economies. There were large swings in the U.S. dollar's value against other currencies over the last ten years. Following a period of dollar strengthening during 1995–2000, the dollar weakened, falling by almost 20 percent against the euro in 2003, and even more against some of the other currencies. In 2004 the dollar's value declined again against the currencies of all the compared economies, although generally at about half the 2003 rate. The largest declines were against the Australian dollar and the U.K. pound (over 12 percent in each case), and the smallest declines were against the Taiwanese dollar (3.1 percent) and Korean won (4.1 percent).

The 2.9 percent decline in U.S. manufacturing unit labor costs in 2004 represents the best performance among all compared economies when the unit labor costs are expressed in U.S. dollars. Taiwan was the only other economy to show a decline in U.S. dollar-denominated unit labor costs, as the Taiwanese dollar strengthened relatively little. Unit labor costs increased in all the other countries, even those that showed declines in their national currencies. The biggest increase was in Australian manufacturing, followed by Denmark, Italy, and the United Kingdom.

Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2004

Average annual rates of change(1)

Country or area	1979-2004	1979-1990	1990-1995	1995-2000	2000-2004	2002-2003	2003-2004
Output per hour							
United States	r4.1	r2.8	3.7	5.7	r5.9	r7.1	r5.2
Canada	2.6	2.0	3.8	3.2	1.8	2.3	2.9
Australia	r2.9	2.8	2.9	r3.8	r2.4	r3.9	r-0.6
Japan	4.0	3.8	3.3	4.1	5.0	11.0	6.9
Korea	NA	NA	9.6	10.8	6.9	7.0	12.1
Taiwan	5.7	6.2	5.2	5.5	5.4	3.6	4.7
Belgium	r3.5	4.2	3.2	r2.7	r3.0	r2.9	3.2
Denmark	2.2	2.1	2.7	1.8	2.0	5.0	0.9
France	4.2	4.2	4.6	5.1	2.5	0.3	3.5
Germany (2)	2.7	2.1	2.9	3.7	r3.1	r3.9	r4.7
Italy	1.5	2.2	2.2	1.0	-0.7	-0.9	-0.6
Netherlands	3.1	3.5	3.5	2.5	2.3	r1.1	5.3
Norway	r1.9	2.0	0.5	1.1	r4.2	r8.6	r2.3
Sweden	r4.7	2.5	r5.8	r7.2	r6.2	r7.2	r9.8
United Kingdom	r3.6	r4.1	3.3	2.6	r3.8	r4.1	r5.6
Output							
United States	r2.9	r2.2	3.6	5.4	r0.9	r1.9	r4.8
Canada	2.5	1.8	2.4	5.9	0.5	0.4	3.8
Australia	1.6	1.6	r0.8	2.6	r1.4	r1.8	r-0.1
Japan	2.9	4.7	0.4	2.0	2.1	9.6	5.5
Korea	8.8	10.1	8.4	7.9	6.6	5.5	11.4
Taiwan	6.0	7.5	4.9	5.6	3.9	5.7	9.4
Belgium	r1.9	2.6	0.6	r2.6	r0.5	r-0.8	2.3
Denmark	1.0	1.0	2.1	1.7	-1.1	-0.4	-2.8
France	2.0	2.0	1.7	3.9	0.3	-0.6	1.0
Germany (2)	r1.0	1.2	-1.0	2.2	r1.3	r1.0	4.6
Italy	1.3	2.0	1.5	1.2	-0.8	-1.3	0.0
Netherlands	1.9	2.5	1.8	2.6	-0.3	-1.6	1.2
Norway	r0.4	-0.4	1.1	1.0	r1.1	r3.0	r2.0
Sweden	r3.7	1.8	r3.8	7.4	r4.2	r3.7	r9.9
United Kingdom	0.6	0.9	0.5	1.3	r-0.6	0.1	r1.9

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2004

Average annual rates of change(1)

Country or area	1979-2004	1979-1990	1990-1995	1995-2000	2000-2004	2002-2003	2003-2004
Total hours							
United States	-1.1	-0.6	-0.1	-0.2	-4.8	-4.9	-0.4
Canada	0.0	-0.2	-1.3	2.6	-1.3	-1.9	0.8
Australia	-1.3	-1.2	-2.0	-1.2	-1.0	-2.0	0.5
Japan	-1.1	0.8	-2.8	-2.0	-2.7	-1.3	-1.3
Korea	NA	NA	-1.1	-2.6	-0.3	-1.3	-0.6
Taiwan	0.3	1.2	-0.3	0.1	-1.4	2.1	4.5
Belgium	-1.6	-1.6	-2.5	-0.1	-2.4	-3.7	-0.9
Denmark	-1.1	-1.1	-0.7	-0.1	-3.0	-5.2	-3.6
France	-2.1	-2.1	-2.8	-1.1	-2.2	-0.8	-2.4
Germany (2)	-1.7	-0.9	-3.8	-1.4	r-1.7	r-2.8	r-0.1
Italy	-0.2	-0.2	-0.7	0.1	-0.1	-0.5	0.5
Netherlands	-1.2	-1.0	-1.7	0.0	-2.5	r-2.7	-3.9
Norway	-1.4	-2.3	0.6	-0.1	r-2.9	r-5.1	-0.3
Sweden	-0.9	-0.7	-1.9	0.3	-1.9	r-3.3	r0.0
United Kingdom	r-2.9	r-3.1	-2.8	-1.3	r-4.3	r-3.8	r-3.5
Employment							
United States	-1.2	-0.8	-0.5	-0.1	-4.5	-4.8	-1.2
Canada	-0.1	-0.2	-1.5	2.4	-1.3	-1.4	-1.0
Australia	-1.4	-1.3	-2.3	-1.1	-0.9	-1.9	0.6
Japan	-0.7	1.0	-1.6	-1.9	-3.0	-2.2	-2.4
Korea	NA	NA	-0.8	-2.5	0.8	-1.2	0.5
Taiwan	0.8	2.0	-0.3	0.4	-0.4	1.7	3.2
Belgium	-1.6	-1.6	-2.2	r-0.6	r-2.0	r-2.9	r-2.4
Denmark	-1.1	-0.5	-1.2	-1.2	-2.5	-4.7	-3.0
France	-1.5	-1.6	-2.5	-0.3	-1.1	-0.6	-2.4
Germany (2)	-1.3	-0.1	-4.2	-0.8	-1.5	-2.6	-1.5
Italy	-0.7	-0.9	-1.6	0.1	0.2	0.2	-0.3
Netherlands	-1.0	-0.8	-1.6	0.2	-2.5	-3.2	-4.0
Norway	-1.4	-2.2	0.3	0.1	r-3.0	r-4.6	r-2.9
Sweden	-1.4	-1.0	-3.5	0.0	-1.6	r-2.6	-1.9
United Kingdom	r-2.8	r-2.9	-2.6	r-1.3	-4.4	-4.8	-3.7

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2004

Average annual rates of change(1)

Country or area	1979-2004	1979-1990	1990-1995	1995-2000	2000-2004	2002-2003	2003-2004
Average hours							
United States	0.1	0.2	0.4	-0.2	-0.3	-0.1	0.8
Canada	0.1	0.0	0.3	0.2	0.0	-0.5	1.8
Australia	0.1	0.1	0.3	-0.1	0.0	-0.1	-0.1
Japan	-0.3	-0.2	-1.3	-0.1	0.3	0.9	1.1
Korea	NA	NA	-0.2	-0.1	-1.0	-0.1	-1.1
Taiwan	-0.6	-0.8	0.0	-0.3	-1.0	0.4	1.3
Belgium	r0.0	0.0	-0.3	r0.5	r-0.4	r-0.8	r1.6
Denmark	0.0	-0.6	0.6	1.1	-0.5	-0.5	-0.6
France	-0.6	-0.5	-0.3	-0.8	-1.0	-0.2	0.0
Germany (2)	-0.4	-0.9	0.4	-0.6	r-0.2	r-0.1	1.5
Italy	0.4	0.6	0.9	0.0	-0.3	-0.7	0.9
Netherlands	-0.1	-0.2	0.0	-0.2	0.0	r0.5	0.1
Norway	0.0	-0.1	0.3	-0.2	0.1	r-0.6	r2.7
Sweden	0.5	0.3	1.7	0.2	-0.3	r-0.7	r1.9
United Kingdom	-0.1	-0.2	-0.2	0.1	r0.2	r1.1	r0.1
Total labor compensation in manufacturing(3): National currency basis							
United States	3.7	4.9	3.4	4.4	0.0	3.0	1.8
Canada	4.6	6.5	2.4	5.2	1.2	1.4	0.7
Australia	NA	NA	r3.4	r3.0	3.8	r4.2	2.5
Japan	1.9	5.5	0.7	-1.1	-2.2	-0.6	-0.8
Korea	14.2	19.6	17.6	5.4	7.0	3.5	10.4
Taiwan	7.8	13.5	6.8	3.6	-0.3	3.7	5.9
Belgium	2.7	4.4	1.3	r1.9	1.1	r-0.9	0.7
Denmark	4.2	6.8	2.3	2.8	1.5	-0.4	0.6
France	3.5	6.5	1.1	1.1	1.5	3.1	0.0
Germany (2)	2.9	4.6	2.4	1.6	0.4	r-0.6	r0.5
Italy	6.8	11.4	4.2	2.9	2.9	2.7	3.2
Netherlands	2.9	3.1	2.8	3.4	1.8	0.6	-0.2
Norway	r4.9	6.5	4.0	5.0	r1.4	r-1.1	r2.3
Sweden	5.5	8.4	2.0	5.3	r2.5	r1.5	r2.2
United Kingdom	4.3	7.1	2.4	3.4	0.1	0.2	0.3

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2004

Average annual rates of change(1)

Country or area	1979-2004	1979-1990	1990-1995	1995-2000	2000-2004	2002-2003	2003-2004
Hourly compensation(3): National currency basis							
United States	4.9	5.5	3.5	4.7	5.0	8.3	2.2
Canada	4.6	6.8	3.8	2.5	2.5	3.4	-0.1
Australia	NA	NA	r5.5	4.3	4.8	r6.3	2.0
Japan	3.0	4.6	3.6	1.0	0.5	0.7	0.5
Korea	NA	NA	18.9	8.1	7.3	5.0	11.1
Taiwan	7.5	12.1	7.1	3.4	1.2	1.6	1.3
Belgium	4.4	6.1	3.9	r2.1	3.5	r2.9	1.6
Denmark	5.4	7.9	2.9	2.9	4.7	5.0	4.4
France	5.7	8.8	4.0	2.2	3.7	4.0	2.5
Germany (2)	4.7	5.6	6.4	3.1	2.1	2.2	r0.5
Italy	7.1	11.7	4.9	2.8	3.0	3.2	2.6
Netherlands	4.1	4.1	4.5	3.3	4.4	r3.4	3.8
Norway	r6.4	9.0	3.4	5.2	r4.5	4.3	r2.6
Sweden	6.5	9.1	4.0	5.1	r4.4	r5.0	r2.1
United Kingdom	r7.4	r10.6	5.4	4.7	r4.5	r4.2	r4.0
Unit labor costs(3): National currency basis							
United States	r0.8	r2.7	-0.2	-0.9	r-0.9	r1.1	r-2.9
Canada	2.0	4.7	0.0	-0.6	0.7	1.0	-3.0
Australia	NA	NA	r2.5	0.4	2.4	r2.3	2.6
Japan	-0.9	0.8	0.3	-3.0	-4.2	-9.3	-6.0
Korea	5.0	8.6	8.5	-2.4	0.3	-1.9	-0.9
Taiwan	1.7	5.5	1.9	-1.9	-4.0	-1.9	-3.2
Belgium	0.9	1.8	0.7	r-0.6	0.5	r-0.1	-1.6
Denmark	3.1	5.7	0.2	1.1	2.6	0.0	3.4
France	1.4	4.4	-0.6	-2.7	1.1	3.7	-1.0
Germany (2)	1.9	3.3	3.4	-0.5	r-1.0	r-1.7	r-4.0
Italy	5.5	9.3	2.6	1.8	3.7	4.1	3.2
Netherlands	0.9	0.6	1.0	0.8	2.1	2.3	-1.4
Norway	r4.4	6.9	2.9	4.0	r0.3	r-4.0	r0.3
Sweden	1.8	6.5	r-1.7	-1.9	-1.6	r-2.1	r-7.0
United Kingdom	3.6	6.2	2.0	2.0	0.7	0.1	r-1.6

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Table B. Output per hour, hourly compensation, unit labor costs, and related measures
Manufacturing, 15 countries or areas, 1979-2004

Average annual rates of change(1)

Country or area	1979-2004	1979-1990	1990-1995	1995-2000	2000-2004	2002-2003	2003-2004
Unit labor costs(3): U.S. dollar basis							
United States	r0.8	r2.7	-0.2	-0.9	r-0.9	r1.1	r-2.9
Canada	1.6	4.7	-3.2	-2.2	4.1	13.3	4.4
Australia	NA	NA	r1.4	-4.3	8.6	r22.8	15.9
Japan	1.9	4.6	9.4	-5.7	-4.3	-2.1	0.8
Korea	1.4	4.9	6.7	-9.5	0.0	2.9	3.2
Taiwan	2.0	8.4	2.2	-5.1	-5.5	-1.5	-0.2
Belgium	0.5	0.6	3.3	r-8.1	8.3	r19.7	8.1
Denmark	2.6	4.1	2.2	-6.1	10.7	19.9	13.6
France	0.6	2.1	1.2	-9.4	9.0	24.2	8.8
Germany (2)	2.5	4.5	5.9	-8.0	r6.7	r17.8	r5.5
Italy	2.9	5.7	-3.5	-3.2	11.7	24.6	13.4
Netherlands	1.5	1.5	3.6	-6.9	10.0	22.4	8.3
Norway	r3.3	4.9	2.6	-2.7	r7.3	r8.2	r5.4
Sweden	-0.4	3.4	r-5.3	-6.7	4.0	r17.9	r2.2
United Kingdom	3.0	4.5	-0.5	1.2	5.6	8.9	r10.4
Exchange rates(4)							
United States	--	--	--	--	--	--	--
Canada	-0.4	0.0	-3.2	-1.6	3.4	12.1	7.6
Australia	-1.7	-3.2	-1.1	-4.7	6.1	20.0	12.9
Japan	2.8	3.8	9.1	-2.7	-0.1	8.0	7.2
Korea	-3.4	-3.4	-1.7	-7.3	-0.3	4.9	4.1
Taiwan	0.3	2.7	0.3	-3.3	-1.6	0.4	3.1
Belgium	-0.4	-1.2	2.5	-7.6	7.7	19.7	9.9
Denmark	-0.5	-1.5	2.0	-7.1	7.8	19.9	9.8
France	-0.9	-2.2	1.8	-6.8	7.7	19.7	9.9
Germany (2)	0.6	1.1	2.5	-7.5	7.7	19.7	9.9
Italy	-2.5	-3.3	-6.0	-4.9	7.7	19.7	9.9
Netherlands	0.5	0.9	2.6	-7.6	7.7	19.7	9.9
Norway	-1.1	-1.9	-0.3	-6.4	6.9	12.8	5.1
Sweden	-2.1	-2.9	-3.7	-4.9	5.7	20.4	9.9
United Kingdom	-0.6	-1.6	-2.4	-0.8	4.9	8.8	12.1

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.

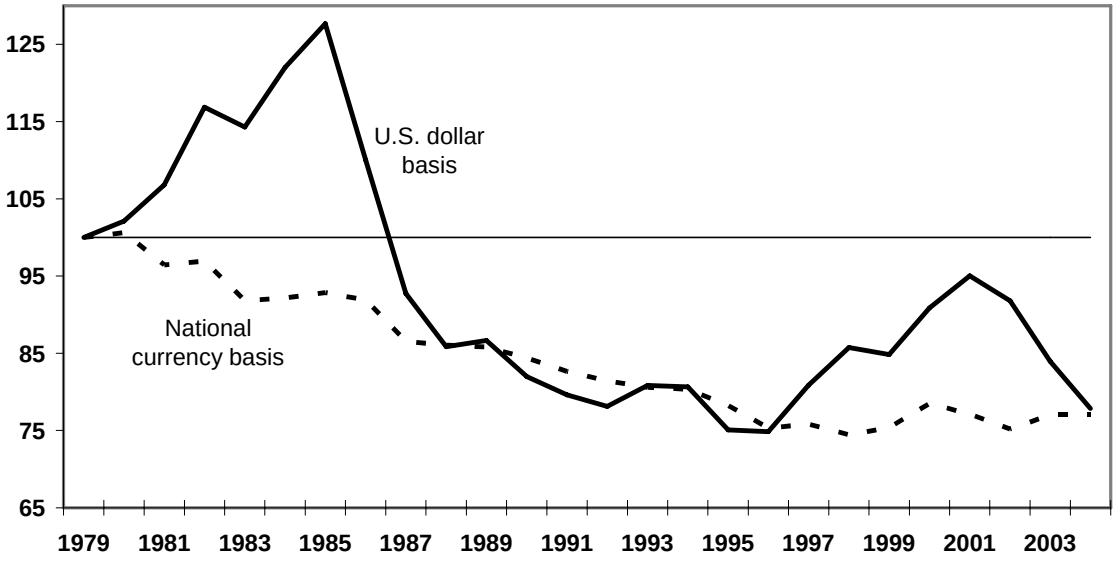
Trade-weighted unit labor costs

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, 1979-2004

(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 "competitors" costs 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 to 1998, 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 dip again after 2001 with a weakening of the U.S. dollar.

Table C. U.S. manufacturing unit labor costs relative to 13[(1)] competitors, 1979-2004

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	100.6	112.7	110.4	102.1
1981	117.6	122.0	96.4	117.6	110.2	106.8
1982	127.4	131.4	96.9	127.4	109.0	116.8
1983	122.7	133.6	91.8	122.7	107.3	114.3
1984	123.8	134.3	92.2	123.8	101.4	122.0
1985	126.2	135.9	92.9	126.2	98.8	127.7
1986	130.1	141.5	91.9	130.1	118.3	110.0
1987	125.4	144.9	86.5	125.4	135.2	92.7
1988	126.5	147.0	86.1	126.5	147.4	85.9
1989	129.4	150.8	85.8	129.4	149.3	86.7
1990	133.4	158.1	84.4	133.4	162.7	82.0
1991	136.8	165.6	82.6	136.8	171.8	79.6
1992	137.8	169.3	81.4	137.8	176.5	78.1
1993	136.9	169.8	80.6	136.9	169.3	80.8
1994	134.2	167.0	80.3	134.2	166.4	80.7
1995	131.9	168.6	78.2	131.9	175.7	75.1
1996	129.0	171.3	75.3	129.0	172.4	74.9
1997	127.1	167.7	75.8	127.1	157.2	80.9
1998	125.7	168.9	74.4	125.7	146.6	85.8
1999	124.4	165.0	75.4	124.4	146.7	84.8
2000	125.8	160.2	78.5	125.8	138.4	90.9
2001	127.4	165.2	77.1	127.4	134.0	95.0
2002	123.5	164.2	75.2	123.5	134.5	91.8
2003	124.8	162.0	77.0	124.8	148.6	84.0
2004	121.2	157.2	77.1	121.2	155.7	77.9

(1) Data for Australia are not available for 1979.
This country has been omitted from this table.

Technical Notes

The comparisons in this release make use of data made available to BLS as of mid-January 2006 by the national statistical agencies.

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.

The Bureau of Labor Statistics 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. For all of the economies, the term "hours" refers to hours worked.

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.

For most countries, 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 other countries and 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 countries, 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.

The output measure for manufacturing in the United States is the chain-weighted index of real gross product originating (deflated value added), introduced by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce in August 1996. 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. While both series are based on annually-changing price weights, 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 countries' national accounts, whereas sectoral output would require a complex estimation procedure. Also, although 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 countries in the extent of vertical integration of industries.

Estimation of manufacturing real output using moving price weights, as recommended by SNA 93, is becoming prevalent. 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).

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

Labor Input. 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. The aggregate hours worked series used for France (from 1970 forward), Canada, Denmark, Norway, and Sweden 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. For the United Kingdom from 1992, an annual index of total manufacturing hours is used. For all other countries, 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. The Italian hours worked series is based on estimates by the Bank of Italy.

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 countries, 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, the Bureau of Labor Statistics 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 country or area 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:

Country	***Weight***	***Country***	***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 countries. Each country measures manufacturing output in its own currency units. To compare outputs among countries, 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. And exchange rates between the previous national currencies of euro-area countries and the U.S. dollar are no longer reported; only the exchange rate between the euro and the U.S. dollar is available.

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.