



INTERNATIONAL LABOR COMPARISONS

International Comparisons of Manufacturing Productivity & Unit Labor Cost Trends

Technical Notes

Last Updated: December 2013

Definitions

Labor productivity is defined as real output in national currency per hour worked. Although the labor productivity measure presented by The Conference Board International Labor Comparisons (ILC) program 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, and are computed as compensation in nominal terms divided by real output.

Methodology

The Conference Board constructs trends of manufacturing labor productivity and unit labor costs from three basic aggregate measures: output, total labor hours, and total compensation. The hours and compensation measures, as well as employment measures presented in this release, generally refer to all employed persons (employees, self-employed persons, and unpaid family workers) in manufacturing.

In general, the measures relate to total manufacturing as defined by the International Standard Industrial Classification (ISIC). The data for some countries, however, are on a slightly different basis than the ISIC definition of manufacturing. Data for the United States are in accordance with the North American Industry Classification System (NAICS), except compensation data before 1987. Canadian data are in accordance with NAICS beginning in 1961. Data for France include parts of mining. These differences do not materially affect the comparability of growth rates.

Most measures are prepared according to the United Nations System of National Accounts 1993 (SNA 93) for the most recent years. For earlier years, data were compiled according to other systems of national accounts. To obtain historical time series, The Conference Board may link together data series which were compiled according to different accounting systems by national statistical offices. For recent years in which national accounts and other preferred statistics are not yet available, the measures may be estimates based on various current indicators.

Output

In general, the output measures are real value added in manufacturing, based on national accounts. However, output for Japan prior to 1970 and for the Netherlands prior to 1960 are indexes of industrial production.

Most countries 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 were estimated using fixed price weights, with the weights updated periodically (for example, every 5 or 10 years). For the United States, the output measure for

the manufacturing sector is a chain-weighted index of real gross product (deflated value added) produced by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce.¹

The U.S. manufacturing 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](http://www.bls.gov/lpc) (<http://www.bls.gov/lpc>). The international comparisons series uses a value added output concept (gross output minus intermediate inputs), while the major sector series is on a sectoral output basis (gross output minus intra-sector sales and transfers).²

Value added measures are used for the international comparisons of productivity trends because the data are more readily available, and also for technical considerations, such as differences among economies in the extent of vertical integration of industries.

Labor Input

In general, the term "hours" refers to hours actually worked. This measure excludes vacation, holidays, and sick leave, but includes paid and unpaid overtime. In cases when hours worked data are not available (typically earlier years), The Conference Board uses other hours measures, such as normal hours.

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 costs measures. For the period before 1987, these series are linked to NAICS-based, employees-only data from the BLS Current Employment Statistics (CES) program.

For most other countries, aggregate hours series are obtained from national statistical offices, usually from national accounts. However, in some cases The Conference Board calculates aggregate hours for years using employment figures from the national accounts or other comprehensive employment series and data on average hours worked.

Compensation (Labor Cost)

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. Compensation is a measure that reflects the remuneration employed persons obtain for their labor. The compensation measures are estimated from national accounts data; where compensation 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. In the supplementary tables, compensation is used for the following tables: Table 13, Real hourly compensation, CPI basis; and table 14, Real average annual compensation, CPI basis.

Labor cost is defined as compensation plus employment taxes minus employment subsidies, i.e. the cost to employers to utilize labor. In the supplementary tables, labor cost is used for the following tables: Table 7, Hourly compensation, national currency basis; Table 8, Hourly compensation, U.S. dollar basis; Table 9, Unit labor costs, national currency basis; Table 10, Unit labor costs, U.S. dollar basis; Table 12, Average annual compensation, national currency basis; and Table 15, Total labor compensation. For the majority of countries, labor cost is the same as compensation. However, for Australia, Canada, France, Singapore, and Sweden, compensation is increased to account for taxes on

¹ 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.

² For more information on sectoral output, see "Measurement of productivity growth in U.S. manufacturing," *Monthly Labor Review*, July 1995, pp. 13-28 at www.bls.gov/opub/mlr/1995/07/art2full.pdf.

payroll or employment. For the Czech Republic, Finland, and the United Kingdom, compensation is reduced for certain years to account for subsidies.

The hourly compensation data in this release are not comparable with data in ILC's "International Comparisons of Hourly Compensation Costs in Manufacturing". Hourly compensation data in "International Comparisons of Hourly Compensation Costs in Manufacturing" are estimated primarily from establishment survey data as opposed to national accounts and relate to all employees as opposed to all employed persons. For more information about the hourly compensation costs series, see <https://www.conference-board.org/ilcprogram>.

Level Comparisons

The Conference Board measures are limited to comparisons of trends rather than levels. The Conference Board does not prepare level comparisons of manufacturing productivity because of technical problems related to the valuation of manufacturing output in different 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 appropriate as a basis for converting output into a common currency, and purchasing power parities (PPPs)³, which are only available at the total economy level, are not suitable for converting output in the manufacturing sector. In addition, there are differences in survey methodology, coverage, and indicators used in each economy that can have a significant impact on the levels of the data used in this report.

Historical Growth Rates

Average annual growth rates are based on the compound rate method. In some cases, The Conference Board links data in order to maintain historical continuity and calculate long-term growth rates. Data for euro-area countries have been converted to euros by applying official fixed euro/national currency conversion rates to years prior to the introduction of the euro. Data for Germany are linked at 1991 to data that pertain to the former West Germany.

³ Purchasing Power Parities 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.