MONTHLY LABOR REVIEW

U.S. Department of Labor
Bureau of Labor Statistics
April 1988

In this issue:

A new PPI price system
Labor market indicators in the U.S. and abroad

U.S. DEPARTMENT OF LABOR
Ann McLaughlin, *Secretary*

BUREAU OF LABOR STATISTICS
Janet L. Norwood, *Commissioner*

The Monthly Labor Review is published by the Bureau of Labor Statistics of the U.S. Department of Labor. Communications on editorial matters should be addressed to the Editor-in-Chief, Monthly Labor Review, Bureau of Labor Statistics, Washington, DC 20212. Phone: (202) 523-1327.

Subscription price per year—$16 domestic; $20 foreign.
Single copy $4.75 domestic; $5.94 foreign.
Subscription prices and distribution policies for the Monthly Labor Review (ISSN 0098–1818) and other Government publications are set by the Government Printing Office, an agency of the U.S. Congress. Send correspondence on circulation and subscription matters (including address changes) to:
Superintendent of Documents,
Government Printing Office,
Washington, DC 20402

Make checks payable to Superintendent of Documents.

The Secretary of Labor has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Second-class postage paid at Washington, DC, and at additional mailing addresses.

April cover:

"Automobile Industry," an oil study for a 1940 mural by William Gropper (1897–1977); one of the paintings in the exhibit, "Special Delivery: Murals for the New Deal Era." on display at the National Museum of American Art, Washington, DC from January 15 through September 11, 1988.

Cover design by Melvin B. Moxley

Regional Commissioners for Bureau of Labor Statistics

Region I—Boston: *Anthony J. Ferrara*
Kennedy Federal Building, Suite 1603
Boston, MA 02203
Phone: (617) 565-2327
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Region II—New York: *Samuel M. Ehrenhalt*
Room 808, 201 Varick Street, New York, NY 10014
Phone: (212) 337-2400
New Jersey
New York
Puerto Rico
Virgin Islands

Region III—Philadelphia: *Alvin I. Margulis*
3535 Market Street
P.O. Box 13309, Philadelphia, PA 19101
Phone: (215) 596-1154
Delaware
District of Columbia
Maryland
Pennsylvania
Virginia
West Virginia

Region IV—Atlanta: *Donald M. Cruse*
1371 Peachtree Street, NE., Atlanta, GA 30367
Phone: (404) 347-4418
Alabama
Florida
Georgia
Kentucky
Mississippi
North Carolina
South Carolina
Tennessee

Region V—Chicago: *Lois L. Orr*
9th Floor, Federal Office Building, 230 S. Dearborn Street
Chicago, IL 60604
Phone: (312) 353-1880
Illinois
Indiana
Michigan
Minnesota
Ohio
Wisconsin

Region VI—Dallas: *Bryan Richey*
Federal Building, Room 221
525 Griffin Street, Dallas, TX 75202
Phone: (214) 767-6971
Arkansas
Louisiana
New Mexico
Oklahoma
Texas

Regions VII and VIII—Kansas City: *Gunnar Engen*
911 Walnut Street, Kansas City, MO 64106
Phone: (816) 374-2481

VII
Iowa
Kansas
Missouri
Nebraska

VIII
Colorado
Montana
North Dakota
South Dakota
Utah
Wyoming

Regions IX and X—San Francisco: *Sam M. Hirabayashi*
71 Stevenson Street
P.O. Box 3766
San Francisco, CA 94119
Phone: (415) 995-5602

IX
American Samoa
Arizona
California
Guam
Hawaii
Nevada
Trust Territory of the Pacific Islands

X
Alaska
Idaho
Oregon
Washington

MONTHLY LABOR REVIEW

APRIL 1988
VOLUME 111, NUMBER 4

Henry Lowenstern, Editor-in-Chief
Robert W. Fisher, Executive Editor

Labor Month In Review

KLEIN AWARD. The Lawrence R. Klein Award trustees selected the authors of the best articles published in the *Monthly Labor Review* in 1987 as winners of the 19th annual Klein Award, to be presented at the Bureau of Labor Statistics awards ceremony on May 10.

The award for best article by a BLS author is shared by Sharon R. Cohany for "Labor force status of Vietnam-era veterans," in the February issue; and Michael W. Horrigan for "Time spent unemployed: a new look at data from the CPS," in the July issue. Winner for the best article by an author outside BLS is Barry Alan Mirkin, an economic affairs officer with the United Nations Economic Commission for Europe, for "Early retirement as a labor force policy: an international overview," in the March issue.

Cited for honorable mention were BLS analysts Joan Borum, James Conley, and Edward Wasilewski for their article, "Collective bargaining in 1987: local, regional issues to set tone," in the January issue.

The Cohany article focuses on the work experience of veterans of the Vietnam era (August 1964-April 1975). These men, now in their prime working ages, accounted for more than 1 in 4 men ages 30–44 in the labor force, according to data from a special supplement to the April 1985 Current Population Survey. With a 94-percent participation rate, they were as likely to be in the labor force as their nonveteran peers. However, veterans of the Vietnam theater were somewhat less likely to be labor force participants (92 percent), in part because of service-connected disabilities.

Vietnam-theater veterans, about 46 percent of the total, were more likely to be unemployed (6.7 percent) than other Vietnam-era veterans (5.4 percent). This reflects their higher incidence of disability and their relatively lower educational attainment and socioeconomic backgrounds. However, black and Hispanic veterans, like other veterans, had lower jobless rates than their nonveteran counterparts.

Some 7 million Vietnam-era veterans were employed at the time of the April 1985 survey. About 20 percent were working in the public sector, probably because government gives veterans preference in hiring. Despite the availability of veterans' educational benefits, veterans were less likely to hold college and postgraduate degrees than their nonveteran peers, and this was reflected in the types of jobs they held. Moreover, economic dislocations in recent years have limited the growth of blue-collar jobs, to the detriment of some veterans who left the service with training in craft, repair, and related fields.

The Horrigan article examines conceptual and empirical problems in selecting the most appropriate measure of the average total time an individual remains unemployed. The focus of the analysis is a comparison of different methods of using data from the Current Population Survey to construct estimates of unemployment duration.

Most earlier studies of duration use published, seasonally adjusted cross-sectional data and incorporate the assumption of a steady state level of unemployment. Horrigan presents an alternate model based on seasonally unadjusted unpublished numbers, which provide a monthly breakdown of the distribution of current spell durations by single weeks of unemployment. From this model can be constructed seasonally adjusted estimates of the size of a newly unemployed group and its remaining sizes in successive survey periods. The group-size values can then be used to construct the average probabilities of remaining unemployed over time, which in turn can be used to derive nonsteady state estimates of the average time it takes a newly employed individual to leave unemployment. Unlike other models of unemployment duration, which tend to lag the business cycle, the new model tends to be coincident with cycle peaks and troughs.

The Mirkin article surveys the use of early retirement policies to manipulate the size of the labor force in western countries in recent decades. Such policies have been more prevalent in Europe than in North America because of the relative stagnation of European employment and the more rapid graying of European populations.

Following a brief discussion of early retirement programs in general, the author presents an inventory of specific measures implemented on a country-by-country basis and examines the impact of the schemes on the labor force participation of older workers. Finally, the analysis of selected schemes in greater detail provides the basis for Mirkin's conclusion that the projected aging of western populations threatens the policy viability of early-out plans, which have the unfortunate side effect of masking macroeconomic failings.

About the award. Trustees of the Klein Award Fund are Lawrence R. Klein; Charles D. Stewart, president; Ben Burdetsky, secretary-treasurer; Peter Henle; Harold Goldstein; Howard Rosen; and Henry Lowenstern. The award was established in 1968 in honor of Lawrence R. Klein, editor-in-chief of the *Monthly Labor Review* for 22 years until his retirement in 1968. Instead of accepting a retirement gift, Klein donated it and matched the amount collected to initiate the fund. Since then he has contributed regularly to the fund as have others. The purpose of the award is to encourage *Review* articles that (1) exhibit originality of ideas or method of analysis, (2) adhere to the principles of scientific inquiry, and (3) are well written. Each winning article carries a cash prize of $200.

Tax-deductible contributions to the fund may be sent to Ben Burdetsky, Secretary-Treasurer, Lawrence R. Klein Fund, c/o School of Government and Business Administration, The George Washington University, Washington DC 20052. □

New stage of process price system developed for the Producer Price Index

The new industry-based system applies input/output transaction relationships to the measurement of industrial price change

ROBERT GADDIE AND MAUREEN ZOLLER

A new industry-based stage of process price index system was first published with the release of the Producer Price Index for January 1988. This new index system for the first time combines the industry price indexes developed through the Producer Price Index revision with inter-industry transaction data from the Department of Commerce Input/Output Tables of the United States to create a rigorous input/output price model of the industrial economy. Development and publication of this new set of industry-based stage of process indexes accomplishes one of the major objectives of the Producer Price Index revision.[1] This revision began in 1977 and now covers virtually all of the nearly 500 Standard Industrial Classification (SIC) industries in the mining and manufacturing sectors of the economy.

In addition to the new industry-based stage of process price system, the Bureau is continuing to publish the traditional commodity-based stage of processing system, which has been the focus of Producer Price Index presentation and analysis since 1978.

The new industry-based stage of process system consists of the following specific indexes:

1. Four major output indexes
   a. Crude processors
   b. Primary processors
   c. Semifinished processors
   d. Finished processors
2. Four major input indexes with two major subindexes for inputs to final demand
   a. Inputs to primary processors
   b. Inputs to semifinished processors
   c. Inputs to finished processors
   d. Inputs to final demand
      (i) Inputs to personal consumption
      (ii) Inputs to capital investment

These new indexes reflect the following advancements in concept and approach:

- Explicit conceptual definition of the type of index produced. In this new system, each index is explicitly either an index of output from or an index of input to a defined economic activity.
- Rigorous allocation of industries to processing stages, using inter-industry shipments flow data developed from the Input/Output Tables of the United States.
- Use of net output and net input weighting to eliminate multiple counting of price change within the stage of process system.

This article discusses the economic interest and conceptual foundation of stage of process indexes, the algorithms for assignment of industries to processing stages, and the detailed methods of weighting and calculation.

Economic interest

Although a single number often is used to summarize the rate of inflation in the economy, there are, at any given

Robert Gaddie and Maureen Zoller are economists in the Office of Prices and Living Conditions, Bureau of Labor Statistics.

time, a variety of rates of price change which characterize different industries and economic sectors. In 1987, for example, the widely cited Producer Price Index (PPI) for Finished Goods rose 2.1 percent. However, in the same year, passenger car prices fell 3.1 percent while gasoline prices climbed 20.5 percent. Also in 1987, the index for Crude Materials moved up 8.8 percent and that for Intermediate Materials, Supplies, and Components increased 5.5 percent.

A major challenge in constructing price indexes is to develop an index system that summarizes this diversity of price change into meaningful analytic constructs. The Bureau's chief mechanism for accomplishing this is the stage of process structure, which has been its primary vehicle for publication and analysis of industrial price change since 1978.

The basic idea of a stage of process system is that the economy can be subdivided into distinct economic segments which can be arranged sequentially so that the outputs of earlier segments become inputs to subsequent ones, up through final demand. As a simple example, one economic sector may produce wheat, which is input to another that produces flour, which is input to another that produces bread. To the extent that such a sequential system of processing stages can be defined, it is possible to trace the transmission of price change through the economy and to develop information on both the timing and magnitude of price passthroughs to final demand.

The stage of process approach is of particular interest when inflationary pressures are first reflected in crude commodities. This was certainly the case with the oil price shocks of the 1970's, but there has long been concern among economists about how price changes in basic industries such as steel are transmitted to other industries and economic sectors.

At the time of the 1973–74 oil price shock, the Bureau's major publication vehicle for producer prices was the "All Commodities" index, which included the full range of priced items irrespective of their degree of fabrication. This index became subject to considerable criticism as oil prices surged because the crude oil price increase was multiplied as it passed through into the cost structures of, first, refined petroleum products manufacturers and then to other producers as the higher energy prices were embodied in their cost structures.[2]

With a stage of process approach, this multiple counting of price change in the same index is limited. In addition, the actual transmission of the crude changes is more easily discerned than when it is masked in a single All Commodities index number.

In 1978, the Bureau shifted its publication emphasis from the All Commodities index to the commodity-based stage of process system. The latter set of indexes had been calculated for many years as an analytic aid. In the commodity-based stage of process system, products priced in the PPI were allocated to three stages of process based on their degree of fabrication and end use. Because industry indexes were not available in the PPI system, it was impossible to create aggregates that would specifically reflect inputs and outputs of defined economic sectors. But it was at least possible to separate out major stages of a product's fabrication to mitigate multiple counting of price change. The Finished Goods index was emphasized because it measured the prices of goods nearest final consumption. The Crude and Intermediate indexes served both as price measures for less fabricated goods and as possible indicators of future movements in Finished Goods prices as price changes were passed through the economy.

While the emphasis on the stage of process system was certainly an analytic advancement from summarizing all price change in a single index number, the commodity-based stage of process system still contains some multiple counting, particularly within the Intermediate Materials index, and is not analytically rigorous in composition or input/output definition. Therefore, the Bureau undertook an effort to produce a stage of process system which would reflect the actual input/output flow of transactions in the economy and which would totally eliminate multiple counting of price change.[3] The new industry-based stage of process system is the result of that effort.

Conceptual design

An industry-based stage of process design places industries in processing stages based on their transaction relationships to other industries. For example, the agricultural industries sell wheat to the flour milling industry which sells flour to the bakery industry. In an industry-based stage of process system, these industries would be placed in sequential stages, because that is the way the sales and the cost impacts flow.

The industry-based stage of process structure is explicitly based on an input/output matrix as displayed in table 1. The left hand column of table 1 consists of all the producing industries in the economy, plus imports. Along the top of the table are arrayed the same economic sectors, along with final demand. Each box or cell within the matrix represents the output of the category in the left-hand column which is consumed by the category at the top of the column. For example, cell "C" represents the output of primary goods producers which is consumed by producers of semifinished goods.

An output index for primary producers will include all of the transactions in cells "A" through "H," except cell "B," which represents the value of sales of primary producers to other primary producers. Alternatively, an input index for primary producers will cover transactions in cells "I," "J," "K," and "L" in the column below primary producers. Again, cell "B" is excluded because it contains only internal sales among primary producers.

This generalized input/output matrix can be used to characterize the basic flow of a stage of process system as well

Table 1. Generalized stage of processing input/output table, all industries

Producing industry	Consuming industry				Final demand			
	Crude	Primary	Semifinished	Finished	Personal consumption expenditures	Capital investment	Exports	Government purchases
Imports		I						
Crude		J						
Primary	A	B	C	D	E	F	G	H
Semifinished		K						
Finished		L						

as the real world problems that may occur in constructing one. As mentioned previously, the fundamental idea of a stage of process system is that there are identifiable and distinct economic sectors which can be arranged sequentially so that the outputs of earlier segments become inputs to subsequent ones up through final demand. Therefore, in an ideal stage of process system, all shipments would occur in the cells just above the shaded diagonal. For example, in an ideal stage of process system, all of the value of output of primary producers would be in cell "C" and all of the value of input to semifinished processors would be in cell "C." Unfortunately, the real world is more complex.

Variations from the ideal stage of process flow take the following forms:

- *Backflow* occurs when part of the output of a given stage of process is consumed by an earlier stage of process. Cell "A" in table 1 represents backflow because output of primary producers is consumed by crude producers. For example, the refined petroleum industry is a primary producer but crude goods industries all use petroleum products such as gasoline. The value of these sales is a backflow.
- *Internal flow* occurs when part of the output of a given stage of process is consumed within that stage of process. Cell "B" in table 1 represents internal flow because it is both output and input to primary producers. The refined petroleum industry also sells gasoline to other primary industries. The value of these sales is an internal flow.
- *Skips* occur when part of the output of a given stage of process is consumed by stages of process beyond the one next forward. Cell "D" in table 1 represents a skip because part of the output of primary producers is consumed by finished producers, a category two stages forward from primary. Continuing the petroleum example, the refined petroleum industry sells a portion of its products directly to finished goods producers. The value of these sales is a skip.
- *Leakages* occur if some portion of output does not appear as input anywhere in the system. This cannot occur if the stage of process system is comprehensive of all transactions, but it is of interest because leakage does occur in partial systems. For example, PPI pricing at this time does not include motor freight (trucking). Therefore, in a stage of process design based on the current PPI price universe, the sales of gasoline and diesel fuel to the trucking industry will simply "leak" out of the system. These outputs will not appear as inputs because the trucking industry which consumes them is not priced.

Much of the discussion of stage of process design emphasizes minimization of backflow as the primary goal. Backflow is a substantial problem, because it introduces circularity into what is supposed to be a sequential system. Additionally, if output is flowing backward, it obviously impairs the forward directionality of the index system which is crucial to its analytic usefulness.

The existence of internal flow has some of the same effects. While internal flow does not cause circularity in the system, it does reduce its forward directionality. Equally as important if not more so, large internal flows would tend to indicate a faulty taxonomy. That is to say, if industries within a stage of process are substantially shipping to each other, there probably are within that stage of process two or more real processing stages which should be separated.

The PPI industry stage of process design takes both backflow and internal flow into account by emphasizing the goal of maximum net forward flow. In terms of table 1, this means that the system should maximize the value of shipments appearing above and to the right of the shaded diagonal.

Skips and leakages present a somewhat different set of problems. While they do not affect directionality of the system, they do create difference between the output of one processing stage and inputs to the next. Leakages are a particularly significant problem because current PPI pricing is substantially limited to mining, manufacturing, and agriculture. Pricing of the service sector is spotty and is only slowly being expanded.

Because skips and leakages cannot at this time be avoided, the PPI stage of process system explicitly provides material input indexes for each stage of process beyond

crude producers. Input indexes also compensate for whatever problems of backflow remain after forward flow is maximized. The difference between the output index of one processing stage and the material input index to the next can be evaluated specifically by comparing these indexes in the PPI system.

Categorization of industries

The PPI stage of process design began with the determination that there should be four stages of process:

- Crude producers
- Primary producers
- Semifinished producers
- Finished producers

This categorization reflects a considerable amount of experience with stage of process index problems. It particularly reflects concern that the Intermediate Materials component in the traditional three-stage PPI system is too broad and is masking significant internal differences. In addition, through the course of allocating industries to processing stages, the magnitude of internal flow was specifically evaluated. The relatively small amount of internal flow achieved indicates that a four-part division is appropriate.

The key set of data needed to allocate industries to processing stages is comprehensive information on the pattern of inter-industry shipments. The basic source of this information is the Input/Output Tables of the United States published by the U.S. Department of Commerce. The input/output tables show all output of goods and services produced by industry and show the goods and services each industry consumes. Using an assumption that firms are indifferent as to the industry of origin for the goods and services they buy, these tables can be recalculated into a matrix of inter-industry shipments. These data can then be used to rigorously evaluate the flow characteristics of any given stage of process allocation. This was done using the 1977 Input/Output tables, which were the most recent available for detailed (537-industry) input/output industry definitions.

Because final demand is predefined and all of the other processing stages are to be defined through the allocation process, the first step in stage of process allocation is to identify those input/output industries shipping to final demand. Those that ship exclusively to final demand must be finished goods producers, because they would have no backflow, no internal flow, and only forward flow to final demand. There are, however, many other industries that do not ship exclusively to final demand but ship a large percentage of their product to final demand. The question then becomes, which of these industries should be allocated to the group of finished goods producers?

To make that determination, a frequency distribution was constructed for all industries showing the proportion of their net shipments that go to final demand. Clearly, industries shipping more than 95 percent of their output to final demand should be classified as finished goods producers and the frequency diagram showed similar numbers of industries shipping 75 to 85 percent and 86 to 95 percent of their output to final demand. The number of industries in the intervals shipping below 75 percent to final demand fell sharply, however. Therefore, as a first cut, all industries that shipped 75 percent or more of their output to final demand were classified as finished producers.

This process was then repeated for earlier stages of process. To determine the first cut for semifinished producers, for example, a frequency distribution was prepared showing shipments of unallocated industries to final demand and to industries previously identified as finished. Through this process, a breakpoint of 60 percent was identified, so that semifinished producers were those industries which shipped 60 percent of their output to finished producers and final demand but shipped less than 75 percent of their output to final demand alone.

A forward breakpoint of 60 percent was also identified for primary producers. Crude producers were the industries left over after the other stages of process were defined.

The result of this series of preliminary allocations was a base stage of processing allocation which could then be iteratively improved by analyzing the net forward flow contribution of individual industries. The specific mechanism for this analysis was calculation of the net forward flow effect for each industry if it were placed in each processing stage with all other industry allocations remaining unchanged. Optimally, an industry should be assigned to the processing stage in which its net forward flow contribution is largest.

The net forward flow effect for each individual industry was expressed as the following:

1. The sum of forward shipments of the industry and the inputs received from prior stages of process, minus
2. The sum of backward shipments of the industry and the inputs received from forward stages of process.

Using this procedure, the allocations were iteratively improved until further reassignments could not significantly improve net forward flow. When the net forward flow statistics between two stages of process were very close for an individual industry, however, there was a preference for placing the industry with other similar industries and to limit problems with skips.

Table 2. Percentages of producing industry output consumed by stage of process, all industries

Producing industry	Consuming industry				
	Crude	Primary	Semifinished	Finished	Final demand
Crude	14.5	30.8	9.5	15.7	29.4
Primary	7.5	11.8	25.9	20.8	34.0
Semifinished	6.2	4.3	7.4	38.8	43.3
Finished	1.1	1.3	1.1	3.1	93.3

Table 3. Percentages of producing industry output consumed by stage of process, processor component only

Producing industry	Consuming industry				
	Crude	Primary	Semifinished	Finished	Final demand
Crude	17.8	53.3	8.8	4.6	15.5
Primary	7.7	13.8	34.3	23.0	21.2
Semifinished	4.9	3.3	8.2	44.6	38.9
Finished	1.8	1.1	1.5	6.3	89.3

Table 2 shows the flow characteristics of the final PPI stage of process design. The percentages shown in the table represent that part of the output of each row stage consumed by each column stage. Using primary producers as an example, the flow pattern is as follows:

- 7.5 percent of the output of primary producers is consumed by crude producers. This is a backflow.
- 11.8 percent of the output of primary producers is consumed by primary producers. This is an internal flow.
- 80.7 percent of the output of primary producers is consumed by forward stages of process (25.9 percent by semifinished, plus 20.8 percent by finished, plus 34.0 percent by final demand). This is forward flow.

The total flow statistics for the entire stage of process structure are: backflow, 5.01 percent; internal flow, 7.86 percent; forward flow, 87.13 percent; and shipments to the next forward stage of process, 57.30 percent.

This system exhibits extremely strong directionality with very small backflow. In addition, the relatively small percentages of internal shipments indicate that the four-stage taxonomy is effectively isolating processing stages. However, there remains a problem with skips, because only 57.30 percent of shipments are going to the next forward processing stage. This serves to underline the importance of specific input indexes as components of the stage of process system.

In addition to considering the flow characteristics of a complete model involving all industries in the economy, the PPI design has to consider the flow characteristics of a more limited model which corresponds to the industries now priced. Although the PPI is moving to increase its coverage of the service sector, the bulk of PPI pricing remains in agriculture, mining, and manufacturing. The set of stage of process indexes that the Bureau is able to produce at this time thus is limited to "processors," or those industries that are primarily engaged in the physical transformation of goods. The net shipments of processors accounted for 42 percent of the total net value of output of all producing industries in the economy, according to the 1977 input/output tables.

A flow analysis was calculated for the processor component alone to evaluate the allocation design for the specific set of industries that would be covered by currently available Producer Price Indexes. The flows in this analysis represent shipments by processors to all industries (processors and nonprocessors) and to final demand. The results appear in table 3. The summary flow statistics: backflow, 5.76 percent; internal flow, 10.59 percent; forward flow, 83.66 percent.

The flow pattern for processors alone is nearly as good as for all industries. The PPI system thus can be rather straightforwardly constructed in two steps. The first step is to produce input and output indexes for processors alone and for processors' input to final demand, using currently available Producer Price Indexes. The second step is to construct a set of indexes for nonprocessors and for the total economy as PPI index coverage is expanded. The new stage of process indexes just introduced reflect completion of the first step of the long-term construction of this system.

Output indexes for processors

The result of the allocation process described above was to place each of the 537 input/output industries in its appropriate stage of process. To create PPI output price indexes, it is necessary to match the PPI four-digit industry net output indexes[4] to those input/output industries that are processors, and then to weight them appropriately.

The Department of Commerce publishes a general concordance between the input/output industry classification and the Standard Industrial Classification. This leads to unique assignment of most four-digit PPI industries which are based on the SIC system. For those remaining cases in which there was not a one-to-one match between input/output and PPI industries, the PPI industries were assigned to the input/output industry that appeared to reflect the bulk of the PPI industry's shipments value. Through this process, each PPI four-digit industry was assigned to one, and only one, stage of process. The final allocation of PPI industries by stage of process appears in exhibit 1.

The industries are weighted into the stage of process total based on their 1982 net output value of shipments. The net output value includes only that portion of output value which goes to industries in other stages of process and excludes shipments among industries within a stage of process. Net output weighting eliminates multiple counting of price change by weighting only those prices that affect other economic sectors. The specific methodology for the industry weights within a stage of process is to multiply the 1982 total value of industry shipments, generally available from either the 1982 Census of Manufactures or Census of Mineral Industries, by a net output ratio calculated from the input/output tables. The net output ratio is the proportion of industry shipments that goes to industries outside the stage of process.

The net output weights are then applied to the PPI four-digit industry indexes, as currently published in table 5 of the Bureau's publication *Producer Price Indexes*, to calculate aggregate indexes by stage of process. Several sub-

indexes also are produced within each stage of process which correspond to important economic characteristics. For example, separate subindexes are produced for foods processors, energy processors, nondurable goods processors, and durable goods processors. The output indexes by stage of process will be published as table 12 in *Producer Price Indexes*. An example of the output index system appears here as table 4.

Input indexes for processors

Construction of input indexes by stage of process is somewhat more complicated than construction of output indexes. In the output indexes, all of an industry's production is assigned to one, and only one, stage of process. In the input indexes, however, a single industry's products may be consumed at several processing stages. In addition, different products within an industry's product line may be consumed by different stages of process. For example, gasoline produced by the petroleum refining industry may be consumed at all stages of process while jet fuel would be predominantly consumed by the processing stage that included airlines.

The input index design, therefore, has to specifically deal with these two issues:

- What proportion of a particular industry's products is consumed by a given stage of process?
- What particular mix of those products is consumed by that given stage of process?

The answer to the first question can be estimated from the input/output tables. Because the input/output tables show consumption of products by commodity category, the pro-

Table 4. Producer Price Indexes and percent changes for the net output of industry by stage of process
(June 1987=100)

Grouping[1]	Relative importance, December 1987	Unadjusted Index[2]			Unadjusted percent changes					
					12 months ending February 1988	3 months ending—				January 1988 to February 1988
		October 1987[2]	January 1988[2]	February 1988[2]		May 1987	August 1987	November 1987	February 1988	
Net output from:										
Crude processors	100.000	101.2	101.8	101.9	5.3	2.6	2.2	−0.3	0.7	0.1
Crude agricultural and feed processors	9.132	96.3	105.1	108.0	(3)	(3)	(3)	8.8	8.1	2.8
Crude agricultural processors	5.438	93.3	103.2	108.8	28.3	18.0	−12.9	12.3	11.1	5.4
Crude feed processors	3.694	100.9	108.0	106.7	11.6	2.9	0.6	4.0	3.6	−1.2
Crude mining processors	48.054	99.3	96.0	95.4	−2.5	1.5	3.3	−4.7	−2.5	−0.6
Crude manufacturing processors less feeds	42.814	104.6	108.0	108.5	(3)	(3)	(3)	3.2	2.8	0.5
Crude nondurables processors	32.093	103.2	105.7	107.0	9.9	2.0	2.3	2.2	3.1	1.2
Crude durables processors	10.721	109.1	115.7	113.6	17.8	3.1	5.0	6.5	2.2	−1.8
Primary processors	100.000	101.4	100.6	100.7	3.4	2.2	2.3	−0.1	−1.0	0.1
Primary agricultural and food processors	15.578	98.1	98.0	98.4	(3)	(3)	(3)	−2.7	1.9	0.4
Primary agricultural processors	13.684	97.7	96.8	97.7	0.9	5.4	−2.3	−4.5	2.6	0.9
Primary food processors	1.894	100.7	107.9	103.7	13.3	9.1	−3.3	12.1	−4.2	−3.9
Primary mining processors	0.940	100.1	101.4	101.3	2.7	1.2	0.3	0.1	1.1	−0.1
Primary manufacturing processors less foods	83.482	102.1	101.1	101.1	(3)	(3)	(3)	0.6	−1.7	0.0
Primary nondurables processors	51.105	102.0	99.1	99.1	2.5	2.0	4.5	−0.2	−3.6	0.0
Primary durables processors	32.377	102.4	104.4	104.4	5.2	0.7	1.1	1.6	1.8	0.0
Semifinished processors	100.000	100.5	102.2	101.9	3.0	1.0	0.0	1.3	0.7	−0.3
Semifinished agricultural and food processors	22.299	98.7	101.2	99.0	(3)	(3)	(3)	2.6	−1.8	−2.2
Semifinished agricultural processors	2.919	97.9	114.1	94.6	−3.3	−1.0	−6.4	34.5	−22.4	−17.1
Semifinished food processors	19.380	98.8	99.5	99.5	1.9	2.8	−1.1	−1.1	1.4	0.0
Semifinished manufacturing processors less foods	77.701	101.0	102.5	102.7	(3)	(3)	(3)	0.9	1.4	0.2
Semifinished nondurables processors	22.684	101.4	103.4	104.0	5.1	0.9	0.7	1.1	2.3	0.6
Semifinished durables processors	55.017	100.8	102.1	102.2	2.9	0.6	0.4	0.8	1.1	0.1
Finished processors	100.000	101.2	101.6	101.9	2.4	0.5	0.4	0.6	0.9	0.3
Finished foods processors	19.785	100.4	100.8	101.0	2.6	1.2	0.9	−0.5	1.0	0.2
Finished mining processors	1.953	103.4	105.3	108.2	7.7	0.0	1.7	1.2	4.6	2.8
Finished manufacturing processors less foods	78.263	101.3	101.7	102.0	(3)	(3)	(3)	0.9	0.8	0.3
Finished nondurables processors	19.588	101.9	103.6	104.1	4.7	0.5	1.4	0.5	2.3	0.5
Finished durables processors	58.674	101.2	101.1	101.3	1.4	0.2	−0.1	1.1	0.2	0.2
Special groupings:										
Crude energy processors	46.413	99.3	95.9	95.3	(3)	(3)	(3)	−4.9	−2.5	−0.6
Crude processors less energy	53.587	103.0	107.3	108.1	(3)	(3)	(3)	4.0	3.5	0.7
Crude processors less agriculture	94.562	101.7	101.7	101.5	(3)	(3)	(3)	−1.0	0.2	−0.2
Crude processors less agriculture and feeds	90.868	101.7	101.5	101.3	(3)	(3)	(3)	−1.1	0.0	−0.2
Crude processors less agriculture, feed, and energy	44.454	104.4	107.7	108.2	(3)	(3)	(3)	3.1	2.8	0.5
Primary energy processors	21.376	102.2	93.3	92.5	(3)	(3)	(3)	−2.4	−10.8	−0.9
Primary processors less energy	78.624	101.2	102.7	103.0	(3)	(3)	(3)	0.7	1.8	0.3
Primary processors less agriculture, food, and energy	63.046	102.1	103.9	104.2	(3)	(3)	(3)	1.6	1.8	0.3
Finished processors less food	80.215	101.4	101.8	102.1	(3)	(3)	(3)	0.9	0.8	0.3

[1] Indexes in this table are derived from the industry indexes in table 5 of the Bureau of Labor Statistics periodical *Producer Price Indexes*. Industries are allocated to stages of process based on inter-industry shipment patterns from the 1977 input/output relationships.

[2] All data are subject to revision 4 months after original publication. Data are not seasonally adjusted.

[3] Not available.

Table 5. Producer Price Indexes and percent changes for net material inputs to industry stage of process and final demand
(June 1987=100)

Grouping[1]	Relative importance, December 1987	Unadjusted Index[2]			Unadjusted percent changes					
					12 months ending February 1988	3 months ending—				January 1988 to February 1988
		October 1987[2]	January 1988[2]	February 1988[2]		May 1987	August 1987	November 1987	February 1988	
Net material input to:										
Primary processors	100.000	102.0	100.0	100.3	5.4	3.5	4.6	−0.3	−2.3	0.3
Foods and agricultural products	12.388	97.1	105.1	107.2	18.7	10.0	−6.3	7.7	7.0	2.0
Crude food and agricultural products	5.634	93.0	101.4	107.8	27.7	18.8	−13.9	12.4	11.0	6.3
Processed foods	6.754	100.8	108.3	106.6	11.6	3.0	0.5	4.0	3.6	−1.6
Energy	37.539	100.8	90.0	89.8	−4.5	3.6	10.3	−6.5	−10.6	−0.2
Goods less food and energy	50.072	104.2	107.0	107.1	10.1	2.0	2.6	3.3	1.8	0.1
Mining products less energy	1.592	97.1	97.7	97.4	0.2	1.2	−0.5	−0.6	0.1	−0.3
Nondurables less food and energy	30.522	103.2	104.8	105.7	8.6	1.7	2.6	2.3	1.7	0.9
Durables	17.958	106.8	111.9	110.8	13.8	2.3	3.0	5.6	2.3	−1.0
Semifinished processors	100.000	101.3	102.5	103.0	5.3	2.4	0.7	0.2	2.0	0.5
Foods and agricultural products	26.290	97.2	96.2	97.7	2.1	5.9	−2.0	−4.7	3.3	1.6
Crude food and agricultural products	24.253	96.9	95.6	97.4	1.7	5.8	−2.0	−5.5	3.7	1.9
Processed foods	2.037	100.6	103.4	101.2	6.5	5.1	−1.1	5.0	−2.3	−2.1
Energy	1.844	102.3	93.8	91.8	−2.9	3.4	9.1	−2.4	−11.7	−2.1
Goods less food and energy	71.865	102.9	105.3	105.4	6.7	0.9	1.5	2.3	1.8	0.1
Mining products less energy	1.003	100.3	102.1	102.1	3.9	1.3	0.7	0.3	1.5	0.0
Nondurables less food and energy	31.444	102.4	104.1	104.6	6.1	0.8	1.6	1.9	1.7	0.5
Durables	39.418	103.4	106.4	106.2	7.4	1.0	1.5	2.7	2.0	−0.2
Finished processors	100.000	101.2	102.6	102.4	3.3	0.7	0.5	1.5	0.6	−0.2
Foods and agricultural products	11.830	100.3	103.1	100.1	1.5	1.4	−1.7	4.5	−2.5	−2.9
Crude food and agricultural products	3.839	102.3	107.9	98.7	−3.8	−3.0	−3.0	15.5	−11.5	−8.5
Processed foods	7.991	99.5	101.0	100.7	4.0	3.5	−1.1	−0.2	1.8	−0.3
Energy	0.726	102.3	93.9	91.9	−2.9	3.3	9.1	−2.6	−11.5	−2.1
Goods less food and energy	87.445	101.3	102.6	102.8	3.5	0.5	0.7	1.1	1.2	0.2
Mining products less energy	0.063	101.3	104.5	104.5	5.4	0.4	1.7	0.8	2.5	0.0
Nondurables less food and energy	30.698	102.0	103.7	104.4	5.5	0.6	1.0	1.8	2.0	0.7
Durables	56.688	101.0	101.9	102.0	2.6	0.6	0.4	0.8	0.8	0.1
Final demand	100.000	101.0	101.1	101.0	(3)	(3)	(3)	0.7	−0.3	−0.1
Consumers	71.917	100.9	100.9	100.6	2.1	1.3	1.0	0.5	−0.7	−0.3
Foods and agricultural products	26.906	99.7	100.8	99.6	0.9	1.3	−0.2	0.8	−1.0	−1.2
Crude food and agricultural products	2.505	100.1	110.6	96.2	−5.8	−1.8	−4.3	20.9	−17.1	−13.0
Processed foods	24.402	99.6	99.9	99.9	1.5	1.6	0.1	−0.9	0.7	0.0
Energy	6.060	100.6	91.1	90.0	−2.6	5.3	9.0	−3.8	−11.9	−1.2
Consumer goods less food and energy	38.950	101.9	102.6	103.0	3.6	0.6	0.6	1.1	1.3	0.4
Mining products less energy	0.003	101.3	102.1	102.1	1.1	−1.5	0.5	2.7	−0.6	0.0
Nondurables less food and energy	22.481	101.8	103.8	104.3	5.0	0.7	1.2	0.6	2.5	0.5
Durables	16.466	102.0	101.1	101.1	1.6	0.6	−0.4	1.9	−0.5	0.0
Capital investment	28.083	101.1	101.7	102.0	2.2	0.3	0.2	0.8	0.9	0.3
Special groupings:										
Final demand less foods and agricultural products	73.093	101.5	101.3	101.5	(3)	(3)	(3)	0.6	0.0	0.2
Final demand less energy	93.910	101.0	101.8	101.7	(3)	(3)	(3)	0.9	0.5	−0.1
Final demand less food and energy	67.004	101.6	102.2	102.6	(3)	(3)	(3)	1.0	1.1	0.4
Consumer goods less energy[4]	91.573	101.0	101.9	101.6	(3)	(3)	(3)	1.1	0.3	−0.3
Consumer goods less foods and agricultural products[4]	62.587	101.7	101.0	101.1	(3)	(3)	(3)	0.4	−0.7	0.1
Nondurable consumer goods less foods[4]	39.687	101.5	101.0	101.2	(3)	(3)	(3)	−0.4	−0.7	0.2

[1] Indexes in this table are derived from the product indexes in table 5 of the Bureau of Labor Statistics publication *Producer Price Indexes*. These indexes are composed of the goods used by the industries in each of the industry stage of process output indexes as shown by the 1977 input/output relationships. These material inputs include only domestic input and do not include any imported materials which may be used.

[2] All data are subject to revision 4 months after original publication. Data are not seasonally adjusted.

[3] Not available.

[4] Percent of final input to consumers.

portionate use is simply the total commodity consumption of industries within the processing stage divided by the total use of the commodity by all industries. The gross commodity weights for the input indexes thus are the 1982 commodity value of shipments, usually from the Census of Manufactures or Census of Mineral Industries, multipled by the proportionate use ratio calculated as above from the input/output tables.

One further step is then required to calculate the final input index weights. The focus of interest in input indexes is in flows into the stage of process, not internal transactions within the stage of process. Therefore, the commodity usage of each processing stage must be reduced by a net input ratio. The net input ratio, calculated from the input/output tables, reflects the proportion of commodity inputs that is received from industries outside the processing stage of interest. For example, the net input ratio for petroleum products would be high in all processing stages except the one that includes the petroleum refining industry.

The total weight available in a given stage of process input index for a single four-digit SIC commodity is:

1. The 1982 total value of four-digit SIC commodity shipments, multiplied by

Exhibit 1. Final allocation of Producer Price Index industries by stage of process

SIC	Industry
	Crude processors
0115	Corn
0116	Soybeans
1011	Iron ores
1021	Copper ores
1031	Lead and zinc ores
1041	Gold ores
1044	Silver ores
1051	Bauxite and other aluminum ores
1061	Ferroalloy ores
1094	Uranium, radium, and vanadium ores
1099	Metal ores, n.e.c.
1111	Anthracite
1112	Anthracite mining services
1211	Bituminous coal and lignite
1213	Bituminous coal and lignite mining services
1311	Crude petroleum and natural gas
1321	Natural gas liquids
1389	Oil and gas field services, n.e.c.
1452	Bentonite
1453	Fire clay
1454	Fuller's earth
1455	Kaolin and ball clay
1459	Clay and related minerals, n.e.c.
1472	Barite
1473	Fluorspar
1474	Potash, soda, and borate minerals
1475	Phosphate rock
1476	Rock salt
1477	Sulfur
1479	Chemical and fertilizer mineral mining, n.e.c.
1481	Nonmetallic minerals (except fuels) services
1492	Gypsum mining
1496	Talc, soapstone, and pyrophyllite
1499	Miscellaneous nonmetallic minerals
2048	Prepared animal feeds, n.e.c.
2298	Cordage and twine
2393	Textile bags
2411	Logging camps and logging contractors
2448	Wood pallets and skids
2611	Pulp mills
2631	Paperboard mills
2646	Pressed and molded pulp goods
2753	Engraving and plate printing
2782	Blankbooks and looseleaf binders
2791	Typesetting
2793	Photoengraving
2794	Electrotyping and stereotyping
2795	Lithographic platemaking services
2812	Alkalies and chlorine
2813	Industrial gases
2816	Inorganic pigments
2819	Industrial inorganic chemicals, n.e.c.
2821	Plastic materials and resins
2823	Cellulosic manmade fibers
2824	Noncellulosic organic fibers
2843	Surface-active agents
2861	Gum and wood chemicals
2865	Cyclic (coal tar) crudes and intermediates, organic dyes and pigments
2869	Industrial organic chemicals, n.e.c.
2873	Nitrogenous fertilizers
2874	Phosphatic fertilizers
2875	Fertilizers, mixing only
2879	Agricultural chemicals, n.e.c.
2893	Printing ink
3274	Lime
3295	Minerals and earths, ground or treated
3313	Electrometallurgical products
3331	Primary copper
3332	Primary smelted and refined lead
3333	Primary zinc
3334	Primary aluminum
3339	Primary nonferrous metals, n.e.c.
3341	Secondary nonferrous metals
3398	Metal heat treating
3399	Primary metal products, n.e.c.
3412	Metal barrels, drums, and pails
3565	Industrial patterns
3624	Carbon and graphite products
	Primary processors
0111	Wheat
0112	Rice
0131	Cotton
0132	Tobacco
0133	Sugar crops
0211	Beef cattle feedlots
0212	Beef cattle, except feedlots
0213	Hogs
0214	Sheep and goats
0241	Dairy farms
0251	Boiler, fryer, and roaster chickens
0252	Chicken eggs
0253	Turkeys and turkey eggs
0254	Poultry hatcheries
0259	Poultry and eggs, n.e.c.
0271	Fur-bearing animals and rabbits
0272	Horses and other equines
0279	Animal specialties, n.e.c.
0912	Unprocessed fin fish
1411	Dimension stone
1422	Crushed and broken limestone
1423	Crushed and broken granite, n.e.c.
1429	Crushed and broken stone, n.e.c.
1442	Construction sand and gravel
1446	Industrial sand

Exhibit 1. Continued—Final allocation of Producer Price Index industries by stage of process

SIC	Industry
	Primary processors (cont)
2046	Wet corn milling
2075	Soybean oil mill products
2076	Vegetable oil mills, n.e.c.
2241	Narrow fabric mills
2269	Finished yarn, raw stock, braided goods and narrow fabric, except knits and wool
2281	Spun yarn, except wool
2282	Texturing, throwing, and winding mill products: cotton, manmade fibers and silk
2283	Wool yarn
2291	Felt goods, except woven felt and hats
2294	Processed textile waste
2296	Tire cord and fabric
2297	Nonwoven fabrics and related products
2299	Textile goods, n.e.c.
2421	Sawmills and planing mills
2441	Nailed wood boxes and shook
2449	Wood containers, n.e.c.
2492	Particleboard
2499	Wood products, n.e.c.
2621	Paper mill products except building paper
2641	Paper coating and glazing
2642	Envelopes
2645	Die-cut paper and board
2651	Folding paperboard boxes
2652	Setup paperboard boxes
2653	Corrugated and solid fiber boxes
2654	Sanitary food containers
2655	Fiber cans, drums and similar products
2661	Building paper and building board mills
2751	Commercial printing, letterpress
2752	Commercial printing, lithographic
2754	Commercial printing, gravure
2761	Manifold business forms
2822	Synthetic rubber
2851	Paints and allied products
2891	Adhesives and sealants
2895	Carbon black
2899	Chemicals and chemical preparations, n.e.c.
2911	Petroleum refining
3031	Reclaimed rubber
3079	Miscellaneous plastic products
3211	Flat glass
3221	Glass containers
3229	Pressed and blown glass, n.e.c.
3231	Products of purchased glass
3241	Hydraulic cement
3264	Procelain electrical supplies
3291	Abrasive products
3292	Asbestos products
3293	Gaskets, packing, and sealing devices
3297	Nonclay refractories
3299	Nonmetallic mineral products, n.e.c.
3312	Blast furnaces and steel mills
3315	Steel wire and related products - mfpm
3316	Cold finishing of steel shapes - mfpm
3317	Steel pipe and tubes - mfpm
3321	Gray iron foundries
3322	Malleable iron foundries
3324	Steel investment foundries
3325	Steel foundries, n.e.c.
3351	Rolling, drawing, and extruding of copper
3353	Aluminum sheet, plate, foil, and welded tube products
3354	Aluminum extruded products
3355	Aluminum rolling and drawing, n.e.c.
3356	Rolling, drawing, and extruding nonferrous metals, except copper and aluminum
3361	Aluminum foundries
3362	Brass, bronze, and copper foundries
3369	Nonferrous foundries, n.e.c.
3423	Hand and edge tools, n.e.c.
3451	Screw machine products
3452	Bolts, nuts, screws, rivets, and washers
3462	Iron and steel forgings
3463	Nonferrous forgings
3469	Metal stampings, n.e.c.
3471	Metal plating and polishing
3479	Metal coating and allied services
3499	Fabricated metal products, n.e.c.
3544	Special tools, dies, jigs, fixtures and industrial molds
3545	Machine tool accessories
3562	Ball and roller bearings
3592	Carburetors, pistons, piston rings, and valves
3599	Machinery, except electrical, n.e.c.
3953	Marking devices
3955	Carbon paper and inked ribbons
	Semifinished processors
0134	Irish potatoes
0161	Vegetables
0171	Berry crops
0172	Grapes
0173	Tree nuts
0174	Citrus fruits
0175	Deciduous tree fruits
0176	Melons
0183	Greenhouse and nursery products
2011	Meat packing plants
2018	Poultry dressing, poultry and egg processing
2023	Condensed and evaporated milk
2026	Fluid milk
2041	Flour and other grain mill products
2044	Rice milling

Exhibit 1. Continued—Final allocation of Producer Price Index industries by stage of process

SIC	Industry
	Semifinished processors (cont)
2061	Raw cane sugar mills
2062	Cane sugar refining
2063	Beet sugar processing
2066	Chocolate and cocoa products
2074	Cottonseed oil mill products
2077	Animal and marine fats and oils
2079	Shortening and cooking oils
2083	Malt and malt byproducts
2084	Wines, brandy and brandy spirits
2085	Distilled liquor, except brandy
2087	Flavoring extracts and sirups, n.e.c.
2092	Fresh or frozen packaged fish
2095	Coffee
2099	Food preparations, n.e.c.
2141	Stemmed and redried tobacco
2211	Cotton broadwoven fabric
2221	Synthetic fiber and silk broadwoven fabric
2231	Wool weaving and finishing
2257	Circular knit fabrics
2258	Warp knit fabrics
2261	Finished cotton broadwoven fabric
2262	Finished synthetic fiber and silk broadwoven fabric
2271	Woven carpets and rugs
2272	Tufted carpets and rugs
2279	Carpets and rugs, n.e.c.
2284	Thread mills
2292	Lace goods
2293	Padding and upholstery filling
2295	Coated fabrics, not rubberized
2394	Canvas and related products
2395	Pleating, stitching, and tucking
2396	Automotive trimmings, apparel findings, and related products
2397	Schiffli machine embroideries
2399	Fabricated textile products, n.e.c.
2426	Hardwood dimension and flooring
2429	Special product sawmills, n.e.c.
2431	Millwork
2434	Wood kitchen cabinets
2435	Hardwood veneer and plywood
2436	Softwood plywood
2439	Structural wood members, n.e.c.
2452	Prefabricated wood buildings and components
2491	Wood preserving
2517	Wood tv and radio cabinets
2519	Household furniture, n.e.c.
2531	Public building and related furniture
2541	Wood partitions and fixtures
2643	Bags, except textile bags
2649	Convered paper products, n.e.c.
2711	Newspaper publishing
2721	Periodical publishing
2732	Book printing
2741	Miscellaneous publishing
2789	Bookbinding and related work
2831	Biological products
2833	Medicinal chemicals and botanical products (in bulk)
2834	Pharmaceutical preparations
2892	Explosives
2951	Paving mixtures and block
2952	Asphalt felts and coatings
2992	Lubricating oils and greases
3011	Tires and inner tubes
3041	Rubber and plastics hose and belting
3069	Fabricated rubber products, n.e.c.
3111	Leather tanning and finishing
3131	Boot and shoe cut stock and findings
3251	Brick and structural clay tile
3253	Ceramic wall and floor tile
3255	Clay refractories
3259	Structural clay products, n.e.c.
3261	Vitreous plumbing fixtures
3262	Vitreous china food utensils
3271	Concrete block and brick
3272	Concrete products
3273	Ready mixed concrete
3275	Gypsum products
3281	Cut stone and stone products
3296	Mineral wool
3357	Nonferrous wire drawing and insulating
3411	Metal cans
3425	Hand saws and saw blades
3429	Hardware, n.e.c.
3431	Metal sanitary ware
3432	Plumbing fixture fittings and brass goods
3433	Nonelectric heating equipment
3441	Fabricated structural metal
3442	Metal doors, sash and trim
3443	Fabricated plate work
3444	Sheet metal work
3446	Architectural and ornamental metalwork
3448	Prefabricated metal buildings
3449	Miscellaneous metal work
3465	Automotive stampings
3466	Metal crowns and closures
3493	Steel springs, except wire
3494	Valves and pipe fittings
3495	Wire springs
3496	Miscellaneous fabricated wire products
3497	Metal foil and leaf
3498	Fabricated pipe and fabricated pipe fittings
3519	Internal combustion engines, n.e.c.
3534	Elevators and moving stairways
3536	Hoists, cranes and monorails
3561	Pumps and pumping equipment

Exhibit 1. Continued—Final allocation of Producer Price Index industries by stage of process

SIC	Industry
	Semifinished processors (cont)
3563	Air and gas compressors
3564	Fans and blowers
3566	Speed changers, drives, and gears
3568	Power transmission equipment, n.e.c.
3579	Office machines, not elsewhere classified, and typewriters
3585	Refrigeration and heating equipment
3589	Service industry machinery
3612	Transformers
3613	Switchgear and switchboard apparatus
3621	Electric motors and generators
3622	Industrial controls
3623	Welding apparatus, electric
3629	Electrical industrial apparatus, n.e.c.
3639	Household appliances, not elsewhere classified
3641	Electric lamps
3643	Current-carrying wiring devices
3644	Noncurrent-carrying wiring devices
3645	Residential lighting fixtures
3646	Commercial lighting fixtures
3647	Vehicular lighting equipment
3648	Lighting equipment, n.e.c.
3671	Electron tubes, all types
3674	Semiconductors and related devices
3675	Electronic capacitors
3676	Resistors for electronic applications
3677	Electronic coils, transformers, and other inductors
3678	Connectors for electronic applications
3679	Electronic components, n.e.c.
3691	Storage batteries
3694	Electrical equipment for internal combustion engines
3699	Electrical equipment and supplies, n.e.c.
3714	Motor vehicle parts and accessories
3724	Aircraft engines and engine parts
3728	Aircraft parts and auxiliary equipment, n.e.c.
3764	Guided missile and space vehicle propulsion units and propulsion unit parts
3769	Guided missiles and space vehicle parts and auxiliary equipment
3822	Environmental controls
3841	Surgical and medical instruments and apparatus
3842	Surgical, orthopedic and prosthetic appliances and supplies
3843	Dental equipment and supplies
3861	Photographic equipment and supplies
3915	Jewelers' materials and lapidary work
3962	Artificial flowers
3963	Buttons
3964	Needles, pins, and fasteners
3991	Brooms and brushes
3993	Signs and advertising displays
3995	Burial caskets
3996	Hard surface floor coverings
3999	Manufacturing industries, n.e.c.
	Finished processors
1081	Metal mining services
1381	Drilling oil and gas wells
1382	Oil and gas exploration services
2013	Sausages and other prepared meats
2021	Creamery butter
2022	Natural and processed cheese
2024	Ice cream and frozen desserts
2032	Canned specialties
2033	Canned fruits and vegetables
2034	Dried and dehydrated fruits, vegetables and soup mixes
2035	Pickles, sauces and salad dressings
2037	Frozen fruits and vegetables
2038	Frozen specialties
2043	Cereal breakfast foods
2045	Blended and prepared flour
2047	Dog, cat, and other pet food
2051	Bread, cake, and related products
2052	Cookies and crackers
2065	Confectionery products
2067	Chewing gum and gum base
2082	Malt beverages
2086	Soft drinks
2091	Canned and cured seafoods
2097	Manufactured ice
2098	Macaroni, spaghetti, and noodles
2111	Cigarettes
2121	Cigars
2131	Chewing and smoking tobacco and snuff
2251	Women's hosiery knit on 300 needles or more and women's knee-high socks
2252	Hosiery, n.e.c.
2253	Knit outerwear
2254	Knit underwear and nightwear
2259	Knitting mills, n.e.c.
2311	Men's and boys' suits and coats
2321	Men's and boys' shirts (except work shirts) and nightwear
2322	Men's and boys' underwear
2323	Men's and boys' neckwear
2327	Men's and boys' separate trousers
2328	Men's and boys' work clothing
2329	Men's and boys' clothing, n.e.c.
2331	Women's, misses', and juniors' blouses, waists and shirts
2335	Women's, misses', and juniors' dresses
2337	Women's, misses', and juniors' suits and coats
2339	Women's, misses', and juniors' outerwear, n.e.c.
2341	Women's and children's underwear and nightwear
2342	Brassieres and allied garments
2351	Millinery

Exhibit 1. Continued—Final allocation of Producer Price Index industries by stage of process

SIC	Industry
	Finished processors (cont)
2352	Hats and caps, except millinery
2361	Girls', children's, and infants' dresses, blouses and shirts
2363	Girls', children's, and infants' coats and suits
2369	Girls', children's, and infants' outerwear, n.e.c.
2371	Fur goods
2381	Fabric dress and work gloves
2384	Robes and dressing gowns, except children's
2385	Waterproof outer garments
2386	Leather and sheep lined clothing
2387	Apparel belts
2389	Apparel and accessories, n.e.c.
2391	Curtains and draperies
2392	Housefurnishings n.e.c.
2451	Mobile homes
2511	Wood household furniture, except upholstered
2512	Upholstered wood household furniture
2514	Metal household furniture
2515	Mattresses, bedsprings and sleep furniture
2521	Wood office furniture
2522	Nonwood office furniture
2542	Metal partitions and fixtures
2591	Drapery hardware and blinds and shades
2599	Furniture and fixtures, n.e.c.
2647	Sanitary paper products
2648	Stationery products
2731	Book publishing
2771	Greeting card publishing
2841	Soap and other detergents
2842	Specialty cleaning, polishing and sanitation preparations
2844	Toilet preparations
2999	Petroleum and coal products, n.e.c.
3021	Rubber and plastic footwear
3142	House slippers
3143	Men's footwear
3144	Women's footwear
3149	Footwear, except rubber, n.e.c.
3151	Leather gloves and mittens
3161	Luggage
3171	Women's and children's handbags and purses
3172	Personal leather goods, except women's handbags and purses
3199	Leather goods, n.e.c.
3268	Pottery products, n.e.c., including fine eathenware food utensils
3421	Cutlery
3482	Small arms ammunition, 30 mm and under
3483	Ammunition, except small arms, n.e.c.
3484	Small arms, 30 mm and under
3489	Ordnance and accessories, n.e.c.
3511	Turbines and turbine generator sets
3523	Farm machinery and equipment
3524	Lawn and garden equipment
3531	Construction machinery
3532	Mining machinery and equipment
3533	Oilfield and gasfield machinery and equipment
3535	Conveyor and conveying equipment
3537	Industrial trucks and tractors
3541	Machine tools, metal cutting types
3542	Metal forming machine tools
3546	Power driven hand tools
3547	Rolling mill machinery
3549	Metalworking machinery, n.e.c.
3551	Food products machinery
3552	Textile machinery
3553	Woodworking machinery
3554	Paper industries machinery
3555	Printing trades machinery
3559	Special industry machinery, n.e.c.
3567	Industrial process furnaces and ovens
3569	General industrial machinery, n.e.c.
3573	Electronic computing equipment
3574	Calculating and accounting machines
3576	Scales and balances except laboratory
3581	Automatic merchandising machines
3582	Commercial laundry equipment
3586	Measuring and dispensing pumps
3631	Household cooking equipment and parts
3632	Household refrigerators and freezers
3633	Household laundry equipment
3634	Electric housewares and fans
3635	Household vaccum cleaners
3636	Sewing machines
3651	Radio and tv's, phonographs, and related equipment
3652	Phonograph records and prerecorded tapes
3661	Telephone and telegraph apparatus
3662	Radio and television communication equipment
3692	Primary batteries, dry and wet
3693	X-ray and electromedical equipment
3711	Motor vehicles and passenger car bodies
3713	Truck and bus bodies
3715	Truck trailers
3716	Motor homes built on purchased chassis
3721	Aircraft
3731	Ship building and repairing
3732	Boat building and repairing
3743	Railroad equipment
3751	Motorcycles, bicycles, and parts
3761	Guided missiles and space vehicles
3792	Travel trailers and campers
3795	Full-tracked armored vehicles
3799	Transportation equipment, n.e.c.
3811	Engineering and scientific instruments
3823	Industrial process control instruments
3824	Fluid meters and counting devices

Exhibit 1. Continued—Final allocation of Producer Price Index industries by stage of process

SIC	Industry	SIC	Industry
	Finished processors (cont)	3914	Silverware, plated ware and stainless steel ware
		3931	Musical instruments
3825	Electrical measuring and integrating instruments	3942	Dolls
3829	Measuring and controlling devices, not elsewhere classified	3944	Games, toys, and children's vehicles, except dolls and bicycles
3832	Optical and analytical instruments	3949	Sporting and athletic goods, n.e.c.
3851	Ophthalmic goods	3951	Pens, mechanical pencils, and parts
3873	Watches, clocks, and watchcases	3952	Lead pencils and art goods
		3961	Costume jewelry and costume novelties, except precious metal
3911	Jewelry, precious metal		

n.e.c. = not elsewhere classified. mfpm = manufactured from purchased materials.

2. The proportionate use of that commodity by the industries in the stage of process, multiplied by
3. The net input ratio for that commodity in that stage of process.

If one is willing to assume that the industries within the relevant stage of process consume all specific products within a four-digit SIC classification proportionately, the total four-digit commodity index could be used directly in calculating an input index. In many cases, that is a reasonable assumption. While the PPI industry index system does not currently contain indexes that are explicitly "wherever made," the primary products commodity indexes published below the four-digit SIC industry indexes in table 5 of *Producer Price Indexes* cover the great majority of commodity shipments. These indexes thus can be used in constructing input indexes without substantially compromising coverage in most cases.

In reviewing the input consumption patterns of stages of process, it was discovered that the consumption of specific products within a general commodity classification was sometimes not proportionate. As an example, within the general classification of motor vehicles, automobiles are more likely to go to personal consumption expenditures and heavy trucks are more likely to go to capital investment. Because the potential for these types of differentiations is virtually endless, the PPI design adopted two guiding principles in looking below the four-digit SIC commodity classification structure:

- A breakout below the four-digit SIC level will occur only when there is clear evidence of different usage patterns and the difference has substantial effect. The effect judgment is subjective but, in general, the PPI design attempted to avoid introducing index complexity when it was unlikely to affect the published input index.
- Breakouts will be based on objective data to the maximum possible extent. This required use of multiple additional data sources, the most important of which were motor vehicle consumption data from the Commerce Department's Bureau of Economic Analysis and petroleum consumption data from the Department of Energy.

The final input indexes thus consist of SIC-based commodity indexes at the four-digit level, and occasionally lower levels aggregated by net input weights on a 1982 value basis.

Input indexes are published for the stages of process beyond the crude category and for final demand. As in the case of the output indexes, a variety of subindexes are also published separating durables and nondurables and other significant product types. The input indexes appear as table 13 of *Producer Price Indexes*, an example of which appears here as table 5.

It should be noted that the subdivisions in the input index design are commodity classifications, which are somewhat different than the industry classifications in the output index design. For example, an industry that produces mostly durable products but some nondurable products will reside completely within durables on the output index structure. In the input index structure, however, the durable products will appear under durables and the nondurable products will appear under nondurables.

Comparison with current indexes

The new industry-based stage of process system outlined above currently is being published along with the traditional commodity-based stage of process structure which has been the focus of Producer Price Index presentation and analysis. The new index system initially cannot be seasonally adjusted because sufficient historical data do not yet exist to allow accurate adjustment.

Clearly, there are significant differences between the current commodity-based stage of process system and the new industry-based system. The most obvious, of course, is that the new industry model has four stages of process while the commodity model has three. The most profound conceptual difference, however, is that the industry-based system is a transaction flow model of input/output indexes

while the traditional stage of process system is a commodity transformation model based on degree of fabrication and end use.

The new industry-based stage of process system allocates industries to one, and only one, processing stage. It then measures price change of inputs to and outputs from the set of industries composing each stage of process. The traditional commodity stage of process structure allocates commodities based on their degree of fabrication and end use. The indexes in the traditional stage of process structure are not specifically designed as either input or output indexes.

Nevertheless, these two assignment mechanisms lead to similar results in many cases. Wheat, flour, and bread are assigned to sequential processing stages in both the traditional commodity and new industry stage of process structures. This reflects both the degrees of fabrication in the production of bread and the way transactions actually flow between industries in the economy.

However, one way in which differences may occur can be seen in the treatment of food grains, such as wheat versus feed grains such as corn. In an index structure based on degree of fabrication, food grains and feed grains look similar. They are both raw agricultural products.

On the other hand, food grains and feed grains are not the same in terms of the way they get to final consumption. Wheat, for example, takes the direct route of wheat-flour-bread mentioned above. In contrast, corn goes to final demand through an additional step because it is primarily input to livestock production, another raw agricultural industry.

In the traditional commodity system, food grains, feed grains, and livestock appear at the same stage of process because they are all raw agricultural products. In the industry-based structure, food grains and livestock appear at the same stage of process because their paths to final demand are similar, and feed grains appear at an earlier stage of process. This reflects the fact that changes in feed grain prices are likely to take longer to get to final demand than would changes in food grain prices.

These important differences in how the new industry-based and the traditional commodity-based stage of process systems are constructed make it difficult to match up indexes from the two systems. In the case of Finished Goods, the third stage in the traditional commodity system, a close match in the industry system does exist, however. The traditional Finished Goods index explicitly defines as finished products those products that go to final demand for personal consumption expenditures and capital investment. The index weights within Finished Goods reflect commodity usage by personal consumption expenditures and capital investment. That is the same conceptual basis as for the industry-based input index for final demand.

This is not to say that the industry-based input index to final demand will behave precisely the same as the current Finished Goods index. The calculation methods are somewhat different and coverage varies to some extent. The overall conceptual designs of the input index to final demand and the Finished Goods index, however, are essentially the same.

At the earlier stages of process in the commodity system there are no precise industry-based analogs. The current PPI Crude Materials index, for example, is neither a conceptual nor operational match to the crude processors output index in the industry system. Neither does the commodity-based Intermediate Materials, Supplies, and Components index have a precise industry-based equivalent.

The major analytic innovation of the industry-based stage of process system, therefore, resides not at the end point, which is similar to the commodity system, but in the index sequences that trace price flows through the economy. In these areas, the precise definition of input and output indexes, the rigorous allocation of industries based on interindustry shipment flows, and the use of net input and net output weighting, can be expected to substantially enhance the analytic power of the Bureau's stage of process system for producer prices. □

———*FOOTNOTES*———

[1] John F. Early, "Improving the measurement of producer price change," *Monthly Labor Review*, April 1978, pp. 7–15.

[2] William Nordhaus and John Shoven, "Inflation 1973: The Year of Infamy," *Challenge*, May/June 1974, pp. 14–22.

[3] Two papers prepared by the Washington-based consulting firm of Joel Popkin and Company contributed significantly to the conceptual development of the industry-based stage of process design: "A Stage-Of-Process Price Index Framework," July 1980; and "Recommendations For Detailed Classification and Aggregation Structure For The Revised Producer Price Index In a Stage-Of-Process Framework," May 1983.

[4] For a discussion of the concepts and methodology of industry net output indexes, see Early, "Improving the measurement"; and *BLS Handbook of Methods*, Bulletin 2285 (Bureau of Labor Statistics, 1988), chapter 7, "Producer Prices."

CPI revision provides more accuracy in the medical care services component

Expenditures dropped because of increases in employer- or government-financed payments; health insurance premiums are now allocated to appropriate commodities and services; unique categories for professional services and hospital and related services were created

INA KAY FORD AND PHILIP STURM

The medical care services component of the Consumer Price Index (CPI) underwent several changes when the CPI was revised. We analyze these changes in expenditure weights, definitions, and structure of the component. We also discuss the methodology (pricing and treatment of quality changes) and data sources used for construction of the medical care services component.

In January 1987, the Bureau of Labor Statistics began publication of the revised Consumer Price Index (CPI). The major objectives of this revision were (1) to update the content and weights of the market basket of goods and services priced for the CPI; (2) to update the statistical sample of urban areas, outlets, and unique items used in calculating the CPI; (3) to improve the statistical methods used for computing a number of CPI components; and (4) to improve operating procedures.[1] This article describes the changes in consumption patterns, definitions, methodology, and data sources of the medical care services component of the revised CPI.

Expenditure weights

The expenditure weights for the CPI-U (all urban consumers) and CPI-W (urban wage earners and clerical workers) were developed from the Consumer Expenditure Survey. The revised CPI expenditure weights are based on Consumer Expenditure Survey data for 1982–84 and replace the expenditures for 1972–73 that were used in the CPI from 1978 through 1986.

The Consumer Expenditure Survey is composed of two separate surveys—an interview survey and a diary survey—both conducted by the Bureau of the Census for BLS. The interview survey is used to collect data for expenditures that respondents can remember fairly accurately for periods of approximately 3 months. The diary survey is designed to obtain expenditure information for small, frequently purchased items that consumers tend to forget. Approximately 5,000 consumer units are contacted each year for each type of survey.[2]

All of the categories under medical care services had their expenditure weights calculated from the interview survey. These expenditures reflect both out-of-pocket expenses not covered by insurance and health insurance premiums paid by survey households.

The 1982–84 Consumer Expenditure Survey data showed that as a proportion of total consumption, the medical care services component was smaller than that of the 1972–73 survey. This decline results from changes in the ways consumers pay for medical care. Major medical expenses very frequently are partially paid for (and sometimes fully paid for) by health insurance, and many insurance premiums are fully or partially paid by employers or by government. Be-

Ina Kay Ford and Philip Sturm are economists in the Office of Prices and Living Conditions, Bureau of Labor Statistics.

cause the CPI reflects only consumer expenditures, employer- and government-provided benefits are not included. In the decade between the two expenditure surveys, the number of these third party-provided benefits increased.[3] During this period, the percentage of full-time workers covered by plans that were fully employer-paid rose from 71 percent in 1971–72 to 73 percent in 1982.[4] Thus, while medical care prices have risen at a rapid rate over the past decade, average consumer unit expenditures on medical care rose less rapidly due to employer- and government-provided benefits.

Table 1 compares relative importances for the old series, based on the 1972–73 Consumer Expenditure Survey, updated by price change through December 1986, to those for the current CPI, based on the 1982–84 Consumer Expenditure Survey, updated by price change to December 1986. For some items, changes in relative importance between the old series and the current index arise not only from the previously mentioned changes in insurance coverage levels and distribution of premium payments between employer and employee, but also from definitional changes.

Health insurance defined

A number of definitional changes have been introduced in the medical care area; the most significant of these relate to the way health insurance premiums in the CPI are represented in the expenditure weights. While this change has no effect on the final index result and is mathematically equivalent to the former procedure, it is believed that the new structure provides a clearer picture of the role of health insurance in the CPI. Health insurance represents only expenditures by consumers for premiums—employer contributions are, of course, not included. Insurance premiums can be viewed as purchasing (1) the medical care for which benefits are paid, and (2) the services of the insurance carrier in administering the policy. This second element has been labeled retained earnings and refers to the operating cost and any profit of the insurance carrier.

In the old series CPI, the entire insurance premium was classified as health insurance. However, within health insurance, it was broken into many subcategories for pricing—one for each type of benefit paid and one for the retained earnings associated with each type of benefit. The price movement for a health insurance benefit stratum (for example, insurance-paid hospital rooms) was the same as the price movement for the corresponding medical item in the CPI (hospital rooms). The price movement for a retained earnings stratum was the combination of price change for the relevant medical care item and an estimate of changes in retained earnings as a proportion of benefits. In the revision, instead of using the price change for hospital rooms (or any other medical item) for both the hospital room out-of-pocket-paid index and the hospital-room-paid-by-insurance index, the expenditures for the two types of hospital room payments are combined in a single index. Thus, the expenditure weight for each medical care item is the combination of the direct out-of-pocket expense for the item and the indirect expense for the item paid from consumer-purchased health insurance.

The current CPI item labeled health insurance, which is defined as the portion of premium payments retained by the insurer in the form of operating expenses and profit, represents the weighting together of the retained earnings of the following carrier groupings:[5]

Grouping	*Percentage of health insurance as of December 1986*
Commercial Carriers	35
Blue Cross/Blue Shield	26
Health Maintenance Organizations	2
Other (Medicare Part B and Medicare supplement policies)	37

Improvements in refining the health insurance component were obtained through expanding the allocation of health insurers' benefit payments.[6] The following tabulation shows the allocation of health insurance benefit payments and percent of total premium payments represented by retained earnings.

	Blue Cross/ Blue Shield	*Commercial Carriers*[1]	*Medicare Part B*[2]	*HMO's*
Hospital room	27.5	21.6	—	11.0
Ancillary services	25.2	19.9	—	17.9
Outpatient services	10.8	8.4	24.4	4.4
Physicians' services	25.6	23.8	69.1	38.1
Other provider's fees (physical therapy, psychiatry, and so forth)	2.4	.8	6.5	7.9
Prescription drugs	2.9	1.9	—	4.4
Eye care	.2	—	—	1.5
Nursing home charges	.2	.3	—	.3
Dental benefits	1.8	6.9	—	5.2
Retained earnings	3.4	16.4	—	9.3

[1] Also used to allocate Medicare supplement policies because no other data were available.

[2] Medicare Part A (hospitalization) is not relevant to the CPI because it is an entitlement program paid through payroll deduction as opposed to insurance or a prepayment plan that consumers purchase by paying premiums, that is, Medicare—Part B—Medical Insurance.

NOTE: Dashes indicate data are not available.

Health insurance pricing

Prior to the 1964 CPI revision, health insurance premiums were directly priced as a fixed amount of protection for the individual consumer by pricing the most widely held Blue Cross/Blue Shield family policy being sold to consumers. Using this method entailed a number of problems involving quality changes over time.

Table 1. Relative importance of the medical care services component in the Consumer Price Index, U.S. city average, December 1986

[In percent]

Item and group	All urban consumers (CPI-U) (1)	Urban wage earners and clerical workers (CPI-W) (1)	All urban consumers (CPI-U) old series	Urban wage earners and clerical workers (CPI-W) old series
Medical care services	4.663	3.975	5.738	5.112
Professional medical services	2.926	2.476	2.600	2.468
Physicians' services[2]	1.554	1.319	1.327	1.310
Dental services[3]	.866	.773	.950	.877
Eye care[4]	.343	.286	—	—
Other professional medical services	—	—	.277	.252
Services by other medical professionals[5]	.164	.099	—	—
Unpriced items	—	—	.047	.029
Other medical care services	—	—	3.138	2.644
Hospital and related services	1.516	1.335	.564	.477
Hospital rooms[6]	.608	.580	.262	.222
Other inpatient hospital services[7]	.567	.487	—	—
Outpatient services[8]	.337	.265	—	—
Other hospital and medical care services	—	—	.299	.252
Unpriced items	.004	.003	.003	.002
Health insurance	—	—	2.574	2.168
Health insurance[9]	.221	.163	—	—

[1] These relative importances reflect corrections to the originally published December 1986 values. See "Relative Importance of Components in the Consumer Price Index, 1987," for further details.

[2] Benefits provided by consumer-paid health insurance constitute 35.1 percent of the relative importance, CPI-U.

[3] Benefits provided by consumer-paid health insurance constitute 8.7 percent of the relative importance, CPI-U.

[4] Benefits provided by consumer-paid health insurance constitute 0.7 percent of the relative importance, CPI-U.

[5] Benefits provided by consumer-paid health insurance constitute 24.7 percent of the relative importance, CPI-U.

[6] Benefits provided by consumer-paid health insurance constitute 61.0 percent of the relative importance, CPI-U.

[7] Benefits provided by consumer-paid health insurance constitute 62.6 percent of the relative importance, CPI-U.

[8] Benefits provided by consumer-paid health insurance constitute 57.0 percent of the relative importance, CPI-U.

[9] Only health insurance premiums paid by the consumer are included in the CPI. The health insurance relative importance includes only that portion of the premium that is retained by the insurance carrier for administrative cost and profit, 9.7 percent of the total premiums for the CPI-U. The portions of the premium that are paid as benefits have been assigned to the relevant medical care categories.

NOTE: Dashes indicate data are not available.

Four basic factors affect changes in the cost of health insurance premiums: (1) increased or decreased medical care costs; (2) changes in health insurance provider administrative costs, surplus requirements, and profit (for commercial carriers); (3) changes in the benefits covered by health insurance policies; and (4) utilization changes. Utilization is the frequency of claims made under a health insurance policy. For example, during an epidemic, the frequency of hospitalization and the number of patient-practitioner contacts would likely go up. This increase in claims changes the policy utilization rate and might cause premium increases. Changes in the costs of covered services and in retained earnings rates are price changes that should be reflected in the index, whereas changes in the other two factors reflect quality and quantity changes and should not be reflected in the CPI. Changes in coverage clearly affect the quality of the policy. Utilization changes are a redefinition of the risk covered by a policy, and thus are also a change in the quality of the policy that should not be reflected in the CPI.

In pricing premiums directly, the Bureau found it impossible to account for quality differences because of changes in the benefits provided by policies and in the utilization of benefits. These problems led the Bureau to switch to the current indirect method of pricing health insurance in the 1964 revision of the CPI. This indirect approach enables the Bureau to reflect in the CPI an estimate of the impact on premium levels of changes in the prices of medical care services covered by health insurance policies, as well as changes in the costs of administering the policies and maintaining reserves and as appropriate, profits. Directly pricing policies would not enable BLS to measure constant quality policy premium changes accurately, because the Bureau has not been able to develop the methodology to factor out of premium changes the impact of changed levels of coverage and utilization. Recent research has made some progress, but direct measurement remains elusive. (See appendix.)

Price movement over time for the health insurance item in the CPI is determined by the following procedures.

Retained earnings ratio. The Bureau obtains calendar year data for premium income, benefit payments, and retained earnings for commercial carriers. For each year, the ratio of retained earnings to benefits is calculated, yielding a retained earnings ratio. Next, the latest year's ratio is divided by the previous year's ratio, and the percent change in the ratios is calculated. Finally, the percent change is allocated into 12 equal portions using the geometric mean, and the change is reflected over 1 year.[7] This method enables BLS to measure the change in price caused by changing retention margins in monthly increments, which is preferable to reflecting the entire annual change in only 1 month.

A similar method is used for Blue Cross/Blue Shield; however, instead of annual data, BLS obtains quarterly data and calculates a four-quarter moving average of these data. For example, the Bureau would calculate a retained earnings ratio using combined data for all four quarters of 1986 and divide it by the ratio calculated from the last quarter of 1985 combined with the first three quarters of 1986. The percent change between the former and latter ratios is allocated equally for the next 3 months using the geometric mean.

Insurance price relatives. The total price movement for each health insurance stratum is estimated using the product of two relatives. The first relative is the change in the retained earnings ratio mentioned previously. The second relative reflects the price change for each of the items to which benefits were separately allocated for Blue Cross/Blue Shield and commercial carriers. (See previous text tabulation showing allocation of health insurance benefit pay-

ments.) For example, within Blue Cross/Blue Shield, the physician services category is moved by the product of the relatives for physicians' services and Blue Cross/Blue Shield retained earnings. These two relatives are both required, because retained earnings levels change with both the change in benefits paid and the change in the unit cost of administering these benefits. This process yields a measure of price change for insurance of constant coverage and utilization. That is, changes in benefit coverage and utilization levels will generally be offset by compensating premium changes, and thus, not significantly affect retention rates. Implicit in the process also is an assumption that the level of service from the individual carriers is strictly a function of the benefits paid. Other changes in the amount of service provided for policyholders, such as more convenient claims handling, will affect the index, but the affects are probably small.

Data changes. Since 1964, the Bureau had been using Health Care Financing Administration data provided by Blue Cross/Blue Shield and the Health Insurance Association of America to compute the retained earnings adjustment for the health insurance component of the CPI. In recent years, the Health Care Financing Administration data for commercial carriers have shown inconsistencies, reflecting many revisions and changes in methodology. Both the commercial carrier data and the Blue Cross/Blue Shield data obtained from the Health Care Financing Administration suffered from lengthy lags between the reference period and release of the data. These limitations on the data led BLS to investigate alternative data sources.

After careful study, the Bureau determined that alternative data sources would be used. The Argus Health Chart, published by the National Underwriters, was an improved data source for commercial insurance carriers. Argus uses a large sample and has a shorter lag for data release than the Health Care Financing Administration. Also, the data used are those the insurance companies are legally required to report to the State insurance regulatory agencies as a legal requirement. In addition, BLS could improve the timeliness of the Blue Cross/Blue Shield retained earnings information by obtaining data directly from Blue Cross/Blue Shield on a quarterly basis, rather than obtaining it annually through the Health Care Financing Administration.

Pricing medical services

A sample of 91 urban areas was selected to represent all urban areas in the country. Within each of these areas, the Census Bureau conducts a Point of Purchase Survey for BLS, which identifies not only how much consumer units spend for each category of consumption, but also where they make the purchase. From this list, BLS selects a sample of medical service providers for each medical service item category.

The process used by the Bureau in the selection of a unique service for direct pricing from a medical provider is called disaggregation. To disaggregate, BLS field representatives start with a general entry-level category, such as physicians' services, and successively narrow the definition stage by stage, using probability selection methods based on revenues and volume information supplied by the respondents. This process yields a representative sample of the variety of services provided, and the resulting price index is, thus, an accurate reflection of price change for the entry-level category.

Continuing with the physician services' example, 10 physician service categories have been identified for the CPI: general medical practice; pediatrics; obstetrics and gynecology; allergy; surgery; psychiatry; orthopedics; cardiology; ear, nose, and throat; and other specialties. The category from which specific services are selected for pricing varies with the specialty of the physician. Within each of the 10 categories are a number of preselected services representative of the category: 15 services for general medical practice (8 types of visits and 7 procedures), and at least 6 for each of the remaining categories. Each service has an accompanying definition that the field representative may adjust according to a specific physician's procedures.

Within each physician's office, the field representative selects, through disaggregation, the specific service to be priced on a continuing basis. To minimize the burden on the physicians of determining the actual sales or volume of their services, the field representative disaggregates through a ranking process. This ranking process is an ordering of eligible services provided by the physician from largest to smallest in terms of revenue. For example, at a general practitioner's office, if we were selecting a quote from among the eight preselected types of visits, the selection process would be as follows: the physician ranks the eight types of visits by revenue; then, using a ranking value table and a random number table, the field representative selects the type of service to be priced. The following tabulation illustrates this process:

Type of visit	*Perform visit*	*Ranking value*	*Cumulative value*	*Selection value (from random number table)*
Office visit, brief	Yes	30	30	....
Office visit, limited service	Yes	20	50	....
Office visit, comprehensive service	Yes	15	65	....
Hospital visit, initial care	Yes	10	75	....
Hospital visit, subsequent care	Yes	10	85	....
Home visit, brief service	No	....	....	....
Emergency department visit	Yes	10	95	....
Consultation comprehensive	Yes	5	100	96

Exhibit 1. Definition of published medical care service indexes

Item	Old series	New series
Medical care services	Professional and hospital services; health insurance imputation	Professional and hospital services; health insurance imputation and dispensing of eyeglasses and outpatient services at hospitals.
Professional medical services (old title: Professional services)	Physicians; dentists; other professionals, such as optometrists, ophthalmologists, podiatrists, chiropractors.	Physicians; dentists; other professionals, such as optometrists, ophthalmologists, opticians, psychologists, and therapists.
Physicians' services	Includes all services by medical physicians in private practice, other than dental and eye care, that are billed by the physician. Includes house, office, clinic, and hospital visits by general practitioners, internists, osteopaths, and other specialists. Excludes podiatrists and other medical practitioners who are not MD's. Ophthalmologists are included in other professional services.	Includes all services by medical physicians in private practice, other than dental and eye care, that are billed by the physician. Includes house, office, clinic, and hospital visits by general practitioners, internists, osteopaths, and other specialists. Excludes podiatrists and other medical practitioners who are not MD's. Ophthalmologists are included in Eye care.
Dental services	Includes dental services performed by dentists, oral or maxillofacial surgeons, orthodontists, periodontists, or other dental specialists in group or individual practice. Some of the specific services included are cleanings, extractions, fillings, orthodontic work, periodontal treatment, bonding, dental sealants, treatment for temporomandibular joint problems, root canal therapy, dentures, bridges, crowns, and orthognathic surgery. Treatment can be provided in the office or in the hospital.	Includes dental services performed by dentists, oral or maxillofacial surgeons, orthodontists, periodontists, or other dental specialists in group or individual practice. Some of the specific services included are cleanings, extractions, fillings, orthodontic work, periodontal treatment, bonding, dental sealants, treatment for temporomandibular joint problems, root canal therapy, dentures, bridges, crowns and orthognathic surgery. Treatment can be provided in the office or in the hospital.
Other professional services	All services performed by other medical professionals, such as podiatrists, chiropractors, psychologists; eye care provided by optometrists and ophthalmologists.	Discontinued.
Eye care	New index	Services provided by optometrists, opthalmologists, and opticians. Includes dispensing of eyeglasses and surgical procedures performed by ophthalmologists in or out of the office.
Services by other medical professionals	New index	Includes services performed by other professionals such as, psychologists, chiropractors, therapists, and nurse practitioners in or out of the office.
Other medical care services	Hospital services, nursing homes, and health insurance imputation.	Discontinued.
Hospital and related medical services (old title: Hospital and other medical services)	Hospital services that include hospital room and board, inpatient services, emergency room visits, and nursing home care.	Hospital services that include hospital room and board, inpatient services, and outpatient services that include emergency room, and nursing home care.
Hospital room	Room and board for any type of hospital room, such as private, semiprivate, routine nursery,	Room and board for any type of hospital room, such as private, semiprivate, rou-

Exhibit 1. Continued—Definition of published medical care service indexes

Item	Old series	New series
	ward, intensive care, or coronary care that is billed by the hospital.	tine nursery, ward, intensive care, or coronary care that is billed by the hospital.
Other hospital and medical care services	Inpatient hospital services such as laboratory tests, radiology, operating room, pharmacy, and emergency room that are billed by the hospital and nursing home care.	Discontinued.
Other inpatient services	New index	Hospital services for inpatients, such as pharmacy, laboratory tests, radiology, and operating room that are billed by the hospital and nursing home care.
Outpatient services	New index	Hospital services for outpatients, such as laboratory tests, radiology, short stay units, ambulatory surgery, physical therapy, and emergency room that are billed by the hospital.

"Consultation comprehensive" is selected, because its cumulative ranked value (100) is the smallest number greater than or equal to the selection value (96), the number selected from a table of random numbers. If ranking of services is not possible, then equal probability is used to select the service for pricing.

The following is an example of service selection for a hospital price quotation. In each hospital, fees for hospital rooms and impatient and outpatient ancillary services are priced. The field representative determines, through probability methods, the category of inpatient ancillary service as well as the specific services to be priced for each hospital. For instance, to determine the specific hospital room services that will be priced over time, the field representative obtains information about fees for standard rooms (semiprivate, ward, nursery, and so on) and special care units (intensive care, coronary care, and so on) from the hospital administration. Using this information and probability tables, the representative may select semiprivate room. The field representative then further defines the service by identifying the type of patient in the room, the bath facilities available, the room location, and other services included with the room.

Other inpatient hospital services are similarly selected. For example, preliminary disaggregation may select, first, the broad category "radiology" (x-ray); then, the more specific category, "diagnostic radiology." The next stage of disaggregation may select "skull examination" from a list of specific types of diagnostic radiology. One more disaggregation step will select the type of skull examination from a list provided by the respondent indicating the four or five most frequently performed tests. Finally, the field representative notes the additional factors, such as the length of treatment and the number of personnel required, to render the final definition of the service to be priced.

Pricing improvements

Prior to the 1987 revision, the collected medical care service prices represented the paying patient rate for professional services and the published charges for hospitals. However, because professional and hospital-related services were used to move the index weights for both out-of-pocket expenses not covered by insurance and insurance benefit payments, the Bureau decided that it would be appropriate to determine if alternate fees were available for such priced services. These alternative fees include private insurance, Blue Cross/Blue Shield, Medicare, and preferred provider organizations. To determine the availability of alternative fees, the Bureau conducted a study during 1985 in eight pricing areas to identify the prevalence of medical care service providers charging different rates to patients covered by health insurance. Where alternative rates existed, the study determined if the rate varied with the insurance provider, and where it did, it was determined if such rates would be readily available to the Bureau each price collection month. Separate Medicaid or other public assistance rates were not considered eligible because they are government subsidized and apply to individuals and households who must meet certain income requirements. Physicians were the only respondents to the survey that reported available alternative fees for selected services, with enough frequency to make selection of payment basis part of the disaggregation process. During 1987, BLS will again be surveying hospitals and dentists to identify the availability of multiple rates for the specific services selected for pricing. If the results warrant, BLS will add selection of payment basis to the initiation procedures for hospitals, dentists, or both during 1988.

To ensure that the CPI properly reflects the marketplace on a continuing basis, a Point of Purchase Survey is conducted

in one-fifth of the CPI's 91 pricing areas each year. From these surveys, a new outlet sample is selected and new unique items identified for pricing. Thus, over a 5-year period, the entire CPI outlet sample and unique item sample are updated.

Restructuring published indexes

As part of the CPI revision, BLS created three new indexes by separating previously combined items, for example, eye care from other professional services, and inpatient and outpatient treatment from other hospital and medical care services.

In exhibit 1, definitions of the indexes in the old and revised CPI are given and the new and discontinued series are indicated. A separate health insurance index is not published, as it is not directly priced and the data are available only with a significant lag.

Exhibit 1 reflects a restructuring that provides unique categories for "professional services" and "hospital and related services." Eye care (including purchase of eyeglasses and contact lenses) has been combined with physicians' services, dental services, and other professional services to form the "professional medical services" index. In the former CPI, a distinction was made between the purchase price of eyeglasses and contact lenses (commodities), and the charge associated with fitting eyeglasses and contact lenses for the consumer (services). It has grown increasingly more difficult to separate provider charges into these components so, in the revised CPI, both eye care commodities and services are included in a single index in the medical care service component. Fees for laboratory tests and x-rays have been moved from professional services and, along with emergency room charges, make up the outpatient services category.

The following tabulation contains the number of current outlets and price quotes for each of the published medical care services.

Service	*Outlets*	*Quotes*
Physicians' services	536	1,099
Dental services	295	635
Eye care	401	402
Other medical professionals	382	392
Hospital rooms	339	562
Inpatient services	323	903
Outpatient services	317	354

Quality changes

One of the most difficult conceptual problems faced in compiling the CPI is to identify accurately and factor out of price measurement any changes in the quality of priced items. The Bureau attempts to identify the quality level of an item by including all of the relevant quality-determining attributes in the description of each unique item priced. To determine if a quality change has occurred, the Bureau obtains the current specifications for the item, and compares them to the previous specifications. When any of these specifications change, a quality improvement or deterioration may have occurred. As a further aid in identifyng whether a quality change may have been introduced, the field representative asks each respondent to identify the specific cause of any significant price change.

The respondents may identify the change as (1) a pure price change (2) a change in the characteristics of the currently priced procedure/service, or (3) a combination of the two. When pricing physicians' services, for example, if the description of the item being priced is a limited office visit for treatment of a sore throat at $35, and the physician indicates that a rate increase has taken place in the office visit to $40 and now will also include a throat culture at $15, making the total cost $55, the following action is taken. The addition of the throat culture would not be reflected as a price increase, because it was not in the described service and would be considered a substitution. The price increase in the office visit, $35 to $40, would be shown in the current month's index. For subsequent pricing comparison, the new service would include the office visit *and* throat culture.

Another example where adjustments can be made for quality differences is the change in a hospital's average length of stay. When pricing hospital rooms, the hospital reports the price of the selected room for 1 day. The hospital respondent also indicates any additional fees that would apply to the selected room/patient type. These fees may be per day (for example, for use of a tv or telephone), or per admission (for example, for an admission kit or admitting charge). The hospital also provides an average length of stay for the type of patient selected or the hospital average. The length of stay is used to prorate the per-admission charges and arrive at an average price per day. The price per day for the CPI, then, includes the base room rate, per day charges, and prorated charges. When the length of stay changes, the total price will change, but the CPI will not reflect this as a price change. An adjustment is made to reflect only the pure price change. The following is an example of a price change and a change in length of stay that resulted in an increase of 8 percent being reflected in the index.

	February 1987	*April 1987*
Base room rate	$210.00	$225.00
Per day charge for tv	3.00	3.00
Length of stay	5 days	4 days
Per-admission, charge for admission kit	$25.00	$35.00
Prorated charge	5.00	8.75
Total price	$218.00	$236.75

The February 1987 adjusted price for use in calculating the final change between February and April, based on a 4-day length of stay is $219.25 ($210 base room rate, $3.00 TV charge, and $6.25 prorated admission charge for a 4-day stay).

Change reflected in the index:

$$\left(\frac{\text{April 1987 price}}{\text{February 1987 price}}\right) - 1 \times 100 = \text{Percent change}$$

$$\left(\frac{\$236.75}{\$219.25}\right) - 1 \times 100 = 8 \text{ percent}$$

Another situation involves hospital inpatient pharmacy prices. A specific medication and dose is selected for pricing with the brand (manufacturer) or generic designation indicated. Although there is an ongoing discussion in the medical community as to what, if any, quality difference exists between branded and generic medications, if the hospital switches from brand to generic or vice versa, the change is reflected in the index. Hospitals normally purchase their drugs in bulk supply negotiating the best possible price, and shifts between brands and to or from generic occur with some frequency in our sample. In the hospital environment, the patient receives the prescribed drug from the pharmacy, therefore, inventory prices are compared, regardless of manufacturer.

Potentially, some quality changes may be counted as price changes. Items that are not accounted for in the description of the item being priced or that the respondent does not know about, such as hospital room modifications, changes in the number and type of nurses that minister to the patient, or the availability of new equipment, are all likely to contribute to determining the price level of the room service priced; these changes are normally treated as price changes because the Bureau either is not aware of the change or has no method available to deal with the change. For instance, it has not been possible to develop a description of a hospital semiprivate room that not only includes the specific room characteristics, but also accounts for all of the hospital plant, equipment, and staff size factors that contribute to the cost of that semiprivate room. Thus, BLS is able to factor out from price change the inclusion of unlimited local telephone usage should it now be included in the price of the room, but the Bureau is not normally able to factor out the effect on the room charge of a change in the nurse to patient ratio.

Also, improved technologies and procedures can lead to quality changes that cannot necessarily be measured by the Bureau. For instance, many physicians have switched from using plaster casts for broken bones to a variety of more comfortable, versatile casts. Inflatable casts are lightweight, removable, and easily refitted to the limb when swelling subsides. Cloth casts are lightweight, removable, and breathable. The new fiberglass casts are much lighter than plaster and can be immersed in water, so that the patient can now bathe while wearing a cast. New advances in the development of porous materials in the manufacturing of prosthetic implants, as in hip replacement surgery, allow the bone to grow around the prosthesis. This is not the case with the nonporous materials that have been commonly used in hip replacement prosthetic implants. Many doctors believe this new procedure offers a great improvement in the results of hip replacement surgery, the outcome being a stronger hip joint than when the nonporous materials are used. These are two examples of improved technologies and procedures that can result in quality changes that currently are hard to identify and adjust for in the CPI. Not only is it difficult to identify the change when it occurs, but at present, no method for assessing the economic value of the change is available.

Summary

This revision, as in the past, enabled the Bureau to update medical care service expenditure weights in the CPI, including a more complete allocation of health insurance premiums. Instead of keeping the portion of premiums that go to benefits under health insurance, the expenditure weight for each benefit category has been added to the appropriate out-of-pocket expense. The unpublished health insurance item represents only the retained earnings portion of premiums paid by households. The specific item categories included in medical care services have also been updated and expanded. A study conducted during the developmental phase of the revision indicated that the Bureau should expand the eligible priced rates for physicians in the CPI to include not only the "self-pay" rate, but also other categories of payment as well. Another study indicated that the direct pricing of health insurance is not feasible because of the difficulty of factoring out from premium changes the effect of utilization levels and modified coverage. In pricing medical care service items, as with other item categories in the CPI, BLS attempts to exclude from price movement the effect of quality changes. However, some quality changes are difficult to assess or are not readily identified, for example, a change in the ratio of nurses to patients, and such changes may be reflected as part of the price change movement in the CPI. □

FOOTNOTES

[1] For additional information on the revised CPI, see Charles Mason and Clifford Butler, "New basket of goods and services being priced in revised CPI," *Monthly Labor Review,* January 1987, pp. 3–22.

[2] In the interview survey, the respondent is visited in each of five consecutive quarters. The purpose of the first interview is to collect information on the characteristics of the consumer unit and to establish inventories of items held by the respondent—properties, vehicles, major durable goods, and insurance policies. In each of the subsequent four interviews, expenditure data are collected for the previous 3 months on all varieties of major consumer expenses.

The diary survey consists of 2 consecutive week-long records of purchases. The goal is to record every purchase made during the 2-week period by any member of the consumer unit, including spouse or children. The diary is used primarily to capture information on grocery store purchases,

gasoline, meals, snacks and beverages, many apparel items, and other small, routine purchases. Spending out of town is not included in the diary survey. In cases where the same expenditures appear in both surveys, the data are evaluated to determine which source should be used.

[3] Robert M. Frumkin, "Health insurance trends in cost control and coverage," *Monthly Labor Review*, September 1986, pp. 3–8.

[4] Frumkin, "Health insurance trends."

[5] The 1982–84 Consumer Expenditure Survey weights updated by the changes in retained earnings as reflected in the CPI between 1983 and December 1986. The retained earnings changes calculated for Commercial Carriers are also used for Health Maintenance Organizations, as no Health Maintenance Organization data currently are available. The retained earnings changes calculated for Blue Cross/Blue Shield are also used for the "Other" category, as currently BLS has no data to calculate combined retained earnings changes for Medicare supplement policies.

[6] Health Care Financing Administration–Insurance Benefit Data, Selected Health Maintenance Organizations, Blue Cross/Blue Shield, selected plans and Selected Commercial Carriers.

[7] A hypothetical example of the calculation of the change in retained earnings for commercial carriers:

Year	Income	Benefits	Retentions	Retentions—Benefits Ratio
1	$100,000	$ 94,000	$6,000	.063830
2	108,000	100,000	8,000	.080000

Year 2 adjustment for change in retentions:

(a) $\frac{\text{Year 2 Ratio}}{\text{Year 1 Ratio}} = \frac{.080000}{.063830} = 1.253329$ relative of change, or 25.33 percent, which is the annual increase in retentions for year 2.

(b) Spreading this annual change equally over 12 months is done as follows:

$$12\sqrt{1.253329} = 1.018995 = 1.9 \text{ percent per month.}$$

APPENDIX: Test of direct pricing of health insurance policies

During 1984 and 1985, another effort was made to test the feasibility of directly pricing health insurance policies. Underlying this direct estimation technique is the basic assumption that health insurance premium changes that are to be reflected in the CPI should include only those items related to changes in the cost of medical care services covered by health insurance policies, and related to changes in the health insurance provider's administrative costs, surplus requirements, and profit needs (of commercial carriers). Changes in premiums related to changes in the utilization of health insurance benefits or changes in the benefit packages themselves have to be factored out of this measure, because they are considered to be changes in the quality of the policies being priced. An accurate index reflecting only changes in the cost of covered medical care services and changes in administrative costs, surplus requirements, and profit needs of health insurance companies will therefore require the pricing of constant quality policies (over time).

First, a data collection document (checklist) was created to describe accurately the numerous variable qualities and characteristics of the many health insurance policies. The checklist is used to rate, classify, and differentiate between the various health insurance policies that were included for test purposes.

Second, health insurance pricing schedules of insurance company policies available from a 1976–77 test pricing program were examined, and a sample of potential respondents was picked to be priced. The sample was chosen to represent commercial carriers and Blue Cross/Blue Shield, individual and group plans, single and family plans, and to exhibit different coverages, qualities, price ranges, geographical areas, and so on. Next, sample respondents were contacted to collect 1984 and earlier pricing and benefit package information on these (or other similar) policies that were initiated in the mid-1970's. From this back-pricing information, an experimental health insurance index was constructed for the period 1977–84.

About 70 health insurance companies were contacted in the survey. Of the 22 companies that provided data, 16 responses representing 95 price quotes were deemed complete. The poor response rate principally reflects the low number of the 1976-77 initiated policies that were still in force when the carriers were contacted again in 1984. Completed responses were described on the checklist along with the annual price trend of the rates they charged to subscribers. The reported health insurance premiums used in this survey were for policies purchased by consumers or policies purchased at work that reflect combined employer/employee contributions. The responses consisted of a fairly representative geographic distribution of policies.

Utilization data, one aspect of quality change, were also requested from insurance company respondents, but only five respondents were willing or able to provide limited utilization data. At this time, appropriate data on utilization and a methodology to account for utilization (quality) changes in the direct pricing of health insurance are not available, and thus are not accounted for in the experimental index. This lack of data had serious effects on the acceptability of the direct pricing approach.

Quality changes stemming from changes in benefit packages were handled in two ways. In some cases, insurance companies indicated the effect on premiums of a given benefit change, allowing the Bureau to adjust these policies for quality changes. In those cases where the impact on premiums of benefit changes was unavailable, comparisons for unadjusted benefit changes were not made. The experimental index is based strictly on the premium changes of policies that did not change coverage plus those for which premium adjustments could be made for changes in coverage. Comparison of the results of the experimental direct price index for health insurance with the indirect method for the same period is shown in the following tabulation (December 1977=100).

December	*Experimental direct pricing*	*Current indirect method*
1977	100.0	100.0
1978	116.8	110.5
1979	128.7	123.6

1980	164.0	133.7
1981	174.4	152.9
1982	211.6	177.2
1983	246.6	183.9

As is evident in the comparison, the direct pricing method indicates a faster rate of increase than the indirect method currently used in the CPI. The differences between the indexes resulting from the two pricing methods may be due to a number of possible causes. Each method measures somewhat different things.

The indirect method is based on price changes in current medical care commodities and services and previous years retained earnings figures. The experimental direct pricing method looks at premiums based on current figures, and even projections by carriers for medical care costs and utilization in coming years. Some of the large price jumps in the direct pricing index between 1979–80 and between 1981–82 were attributed to shifts by many of the healthiest subscribers out of their current plans into Health Maintenance Organizations or lower-cost/higher-deductible plans. It has been suggested by some insurers that a disproportionate number of those who made the shift were the young and healthy consumers who use less medical care and, hence, make fewer claims against health insurers or Health Maintenance Organizations. This left the affected plans with an older, less healthy pool of subscribers who made a higher level of claims. The resulting increased costs for the health insurers may have caused some of the sharp increases in the direct pricing index. This type of utilization change is exactly the type of quality change that should not be included in the index, and the inability to obtain data on the premium impact of these utilization changes is the chief roadblock to developing a directly priced health insurance index.

No 'rules of the game'

When Congress passed the National Labor Relations Act in 1935, there was some expectation that labor and management would come to an implicit understanding on the "rules of the game" in labor relations and that the regulatory apparatus set up in the act would seldom be needed. Fifty years later, the most striking feature of U.S. labor relations policy is the sheer volume of regulatory activity. The number of unfair labor practice charges filed with the National Labor Relations Board (NLRB) was 6,807 in 1938, the year after the Supreme Court upheld the act's constitutionality, and in the postwar period the number rose from 5,809 in 1950 to 44,063 in 1980.

—ROBERT J. FLANAGAN
Labor Relations and the Litigation Explosion
(Washington, The Brookings Institution, 1987),
p. 24.

Semiconductor productivity gains linked to multiple innovations

High productivity gains, especially in the 1970's, stemmed mainly from rapid improvements in product design and manufacturing techniques and processes

MARK SCOTT SIELING

Output per employee hour in the semiconductor industry rose at an average annual rate of 13.1 percent between 1972 and 1986—a much higher rate than for all manufacturing, 2.4 percent.[1] Output increased 21 percent a year and employee hours, 6.9 percent. The long-term trend in productivity masks two distinct periods during which annual rates changed markedly. The rates moved as follows:

	Output per employee hour	*Output*	*Employee hours*
1972–86	13.1	21.0	6.9
1972–81	16.6	25.4	7.5
1981–86	4.1	9.5	5.2

Between 1972 and 1981, average annual output growth (25.4 percent) was more than three times higher than employee-hour growth. The major factor behind the strong output performance was the continual innovation in integrated circuits combined with the industry's adroitness in rapidly turning such innovations into low-cost, mass-produced devices. In an environment of rapidly evolving products and low unit prices, myriad new uses were found for semiconductor devices and most existing electronic products, such as computers and military hardware, were substantially upgraded.

These factors were also present during the first half of the 1980's, but gains in output per employee hour were less than one-quarter of those registered in the 1970's—4.1 as against 16.6 percent per year. During the 1981–86 period, output growth was dampened by increasing Japanese competition and a series of slowdowns in computer manufacturing (a major user of semiconductor devices). Increases in average employee hours also lessened during the early 1980's—from 7.5 percent a year in 1972–81 to 5.2 percent in 1981–86. The slowdown mainly reflected less robust output growth. While circuits became more intricate, they required more employee hours to design and produce; this tendency was partially offset by the increasing use of computers in both design and manufacturing processes and by more automated production techniques.

Output and demand. The semiconductor industry manufactures two major types of products—discrete devices, such as transistors and diodes, which perform only one electronic function; and integrated circuits (chips) which are arrays of discrete devices imprinted on small pieces of silicon. Increases in industry output since the late 1960's stem, to a large degree, from rapid growth in the production of integrated circuits. In 1966, integrated circuits accounted for about one-eighth of all semiconductor production, for over one-half in 1972, and for almost four-fifths in 1980. During the same period, their current dollar value leaped from just over $100 million to about $6.5 billion.

The earliest integrated circuits, developed in the late 1950's, contained fewer than 10 discrete devices. By the late 1960's, chip capacity had increased a hundredfold. Since then, chip capacity has doubled about every 2 years; in 1987, a chip the size of a postage stamp might hold up to 16 million separate elements.[2] While this increase in capac-

Mark Scott Sieling is an economist in the Division of Industry Productivity Studies, Bureau of Labor Statistics.

ity would probably, by itself, have promoted strong output and demand growth, its effects were intensified by the industry's ability to supply large numbers of chips and by declining unit prices.

Prior to the late 1960's, the semiconductor industry focused on manufacturing customized integrated circuits for computer manufacturers and the military.[3] Limited production runs meant that development, overhead, and labor costs were spread over a small number of chips, and unit prices tended to be relatively high. In addition, chips designed for one purpose could not be readily adapted for another. With the introduction of the first high-capacity standardized memory chip in the late 1960's, emphasis was increasingly placed on both enlarging chip capacity and quickly attaining mass production status. Peak production (in terms of hundreds of millions of chips) typically occurred about 3 years after the first prototypes of a new chip generation were introduced. High production levels then tapered off as the next generation of chips entered the mass production stage.[4]

When a new generation of integrated circuits was introduced, individual unit prices were much higher than for the previous generation. As firms gained manufacturing experience, unit prices typically fell by 30 percent with each doubling of production.[5] Not only were unit prices eventually lower than the previous generation's, but, because the improved devices contained more elements, the cost per electronic function also declined. For example, the cost for a bit of memory (a single piece of information such as a letter or digit) dropped from just under 1 cent in 1973 to around one-thousandth of a cent in 1986.[6]

During the 1970's, the combination of declining unit prices, higher capacity devices, and standardized products led to explosive growth in demand for integrated circuits because of substantial upgrading of existing computer hardware and military equipment. Demand was further spurred by the development of new products, such as video games and watches, and the replacement of mechanical controls by solid state electronic devices in a wide variety of products ranging from refrigerators and thermostats to automobiles and industrial equipment. In 1968, 50 percent of total semiconductor output was used in military applications, computer manufacturing absorbed 30 percent, and consumer and industrial goods, 20 percent.[7] By 1979, military use accounted for only 10 percent of total semiconductor output; computers, 30 percent; and industrial and consumer goods, 60 percent.

While improved circuits were still being introduced and unit prices continued to decline during the first half of the 1980's, a slackening of growth in computer manufacturing and increased foreign competition retarded demand for and output of U.S. manufactured semiconductor devices. In the 1970's, for example, U.S. companies supplied about 60 percent of world demand for semiconductor devices; by 1985, their share had shrunk to 45 percent, while the market share held by Japanese firms had increased from 25 percent to 40 percent.[8]

Within these long-term trends, year-to-year movements in output and employee hours also reflected general business activity but were usually more volatile—as illustrated by the almost 30-percent output decline in 1975 and the 60-percent increase in 1976. (See table 1.) Such large year-to-year changes stem from a number of causes. When the demand for electronic equipment and products declines, manufacturers reduce their purchases of semiconductor devices to a much larger extent than they reduce production of finished electronic goods, resulting in inventory depletion.[9] As demand recovers, they often double or triple their orders for semiconductors to ensure delivery and rebuild inventories. Such rebounds occasionally coincide with the commercial introduction of a new chip generation—as in 1976, when 4K memory chips (containing 4,000 memory bits) first became available in large quantities and at low unit prices. When that happens, electronic goods manufacturers not only increase their orders for older generation chips but also place large orders for improved chips.[10]

Yield ratios. The basic building block of integrated circuits is a flat wafer (disc) of silicon on which large numbers of individual discrete devices, such as transistors, are imprinted. A key factor in increasing output per employee hour is the ability to increase the number of usable devices on a wafer. The same amounts of material and production worker labor used to produce a wafer yielding a small number of good chips are needed to produce a wafer yielding a larger number of good chips. As the yield of good chips improves—typically from an initial low of 5 percent or less to around 60–70 percent—unit prices decline because output dramatically increases.[11]

Table 1. Productivity and related indexes for the semiconductor industry, 1972–1986
[1977=100]

Year	Output per employee hour	Output	All employee hours	Employees
1972	46.3	36.4	78.7	78.1
1973	53.6	51.0	95.2	94.8
1974	64.1	63.5	99.0	100.5
1975	56.0	45.8	81.8	82.5
1976	82.5	72.4	87.8	88.0
1977	100.0	100.0	100.0	100.0
1978	120.5	139.0	115.4	114.5
1979	138.1	190.4	137.9	136.3
1980	149.4	226.1	151.3	151.5
1981	171.6	260.5	151.8	151.7
1982	197.9	301.2	152.2	153.0
1983	211.5	339.9	160.7	159.3
1984	229.2	432.5	188.7	185.6
1985	206.1	392.3	190.3	189.4
1986	218.4	399.4	182.9	181.4
	Average annual rates of change			
1972–81	16.6	25.4	7.5	7.5
1981–86	4.1	9.5	5.2	4.9

Achieving high yield ratios, however, is not an easy task and depends more on the refining of manufacturing processes than on the gaining of experience by production workers (let alone on differences in material inputs).[12] Attaining acceptable yield ratios using standard production processes requires coordinating and adjusting hundreds of separate manufacturing stages, some of which involve new machinery and techniques, because processes used in research and development are not directly transferable to regular production lines.[13] This effort initially requires large amounts of skilled engineering and technical employee hours, but as yield ratios improve, these requirements ease and production labor inputs per good chip also decline.[14]

Although this process is repeated for each new generation of integrated circuits, recent advances in computer-assisted and computer-integrated manufacturing techniques have lessened the time required to achieve acceptable yield ratios as well as the cost associated with small runs of customized chips.[15]

Employment and hours. Between 1972 and 1986, employment in the semiconductor industry more than doubled, from 115,000 to 268,000 workers. Overall, employment increased at an average annual rate of 6.8 percent during this period, compared with a 0.2-percent decline for all manufacturing industries combined. Average weekly hours of semiconductor production workers, however, were similar to those of their counterparts in all manufacturing—about 40 hours per week. Overtime hours for both groups also were almost identical, averaging about 3 hours per week.

Paralleling annual average rates of change in employee hours, semiconductor employment gains were also higher in the 1972–81 period (7.5 percent) than in the 1981–86 period (4.9 percent), although increasing circuit complexity necessitated more design work and more complex manufacturing techniques—just as circuit density doubles every 2 years, it has also been estimated that design costs increase almost as rapidly.[16] This trend was mitigated, however, by the increasing use of computer-aided design and computer-integrated manufacturing systems as well as the introduction of more highly automated production machinery and process.[17]

During the 1972–86 period, the rate of increase in the number of nonproduction workers (8.7 percent a year) was almost twice as large as the rate for production workers (4.6 percent). This disparity partially reflected the rapid pace of product innovation within the industry. Regardless of year-to-year fluctuations in demand and output, semiconductor firms maintain large research and development staffs of engineers and computer specialists designing the next generation of integrated circuits. Year-to-year changes in production worker employment more closely follow yearly changes in output. In 1985, for example, output declined by 9.3 percent and production worker employment fell by 8.1 percent. Nonproduction employment, however, increased by almost 10 percent.

Occupational structure

Considering the highly technical nature of semiconductor devices and the emphasis placed on rapid innovation, it is not surprising that the industry's work force mainly consists of engineers, computer programmers, and other technical workers. With the increasing complexity of chips and manfacturing processes, the proportion of employees classified as nonproduction workers has also increased—from around 40 percent in the 1960's to 50 percent in the 1970's and 60 percent in the early 1980's. Production workers accounted for only two-fifths of the total work force during the 1980's—a much lower proportion than for manufacturing, in which about two-thirds of all employees are production workers. Semiconductor assemblers, testers, and inspectors represent the largest production occupations. Predominantly consisting of women, these occupations make up about one-half of total production employment.[18]

Just as increasing product complexity has changed the broad occupational structure of the semiconductor industry, it has also affected the composition of the production work force. Each succeeding product generation has called for more sophisticated manufacturing techniques and equipment, which, while obviating the need for low-skilled manual production workers, has raised the demand for higher skilled technicians and machine operators.[19] This shift is also reflected in average production worker earnings. As more of the production work force consisted of relatively high-paid technicians and machine operators, average production worker earnings rose from 10 percent below the all-manufacturing average in 1972 to parity in 1985.

Industry structure

Although the number of semiconductor firms more than doubled between 1972 and 1985—from 325 to 766—the industry remained highly concentrated. Establishments employing 1,000 workers or more have continually accounted for about two-thirds of total employment and industry shipments, even through they represent only about 5 percent of the total number of establishments in the industry. The relatively low proportion of employment and shipments accounted for by smaller sized establishments, however, belies their importance. Traditionally, these firms have developed a disproportionate number of product improvements and manufacturing innovations.[20]

The industry relies mainly on outside suppliers to provide it with the basic materials used to produce semiconductors, such as silicon crystals, metals, chemicals, ceramics, and plastics. The highly specialized machinery used in manufacturing integrated circuits is mainly supplied by outside firms, which in many instances, have initiated innovations in materials or machinery which subsequently led to improvements in semiconductor products.[21] In recent years there has been increasing collaboration between semiconductor manufacturers and their customers as the industry

shifted back towards producing semicustomized and customized chips.[22]

The early 1980's witnessed an increase in the number of firms specializing in specific areas of semiconductor production, such as designing integrated circuits or stages of the manufacturing process.[23] Given the large increase in the cost of an average semiconductor plant—from roughly $10 million in 1975 to $100 million in 1985—very few complete manufacturing facilities have been built in recent years.[24] Large semiconductor companies, however, typically construct complete facilities encompassing all stages of semiconductor manufacturing, from design to testing.

California accounts for about one-third of total semiconductor employment and shipments. Other major centers are located in Arizona, New York, Massachusetts, and Texas.

Capital expenditures. Between 1972 and 1985, semiconductor capital expenditures grew at an average annual rate of 22.5 percent or about 7 times faster than the rate for all manufacturing combined (3.3 percent per year). In most years, about four-fifths of total capital investment is spent for new machinery rather than for buildings. The torrid pace of capital expenditure mainly reflects the rapid obsolescence of production machinery—the average useful life of equipment in the industry is between 3 and 5 years. Each chip generation typically requires new production equipment or major upgrading of existing equipment to cope with the smaller element sizes of the improved circuits.[25]

Total capital expenditures of the semiconductor industry rose in constant dollar terms[26] from $453 million in 1972 to $2,832 million in 1985. Constant-dollar expenditures per worker have also been consistently higher than for all manufacturing. In 1985, for example, they ran $3\frac{1}{2}$ times higher for semiconductor employees ($14,872) than for all manufacturing employees ($4,429).

Despite high levels of capital investments, the semiconductor industry is still one of the most highly labor intensive of any manufacturing industry, mainly attributable to the complexity of the batch production process employed by the industry and the production adjustments needed to produce new generations of chips.[27]

Semiconductor capital expenditures, of course, varied from year to year, mainly reflecting changing business conditions, product life cycles, and industry expectations. Between 1972 and 1985, more than half of the year-to-year changes fluctuated by 33 percent or more.

Research and development. The semiconductor industry is one of the most research and development oriented sectors in U.S. manufacturing. In 1977, for example, the industry spent 24.9 percent of sales on research and development, compared with 3.1 percent of sales for all manufacturing industries combined.[28] The relatively high output and productivity gains registered by the semiconductor industry reflect the success of these research and development efforts because product improvements have spurred demand, and manufacturing innovations largely stem from in-house research and development efforts.[29]

Manufacturing techniques and technologies

There are four major stages in semiconductor production—design, imprinting, assembling, and testing. Given the close-knit nature of the semiconductor manufacturing process, however, the separate contributions of improvements in each of these areas to overall industry productivity cannot be measured precisely.

In the design phase, engineers draw a series of integrated circuit blueprints. Because the ability to design products quickly both spurs the demand for new generations of semiconductors and makes semicustomized chips more economical,[30] the industry has continually increased its use of computer-assisted design and engineering systems. Productivity advances stemming from the use of these systems may be either constrained or hastened by changes in the manufacturing process. On the one hand, designs may have to be substantially modified because of manufacturing limitations while, on the other hand, advances in manufacturing techniques or materials may compel major changes in design parameters.[31]

After the design phase, devices are manufactured by imprinting silicon wafers with layers of circuitry. First, blueprints are reduced to the actual size of the device and turned into stencils. A stepping machine then duplicates a single stencil repeatedly until a master mask consisting of 400 to 600 identical chip stencils is created.[32] Next, a variation of photolithography is used to transfer these mask patterns onto silicon wafers. A wafer is first coated with a thin film of electrically conductive material and then with a layer of photosensitive material that hardens on contact with light. Shining light through the master stencil onto the wafer creates patterns in this top layer. Various solvents are then used to dissolve the soft parts, leaving a tracery of conductive material. This process is repeated again and again, eventually creating hundreds of identical chips on a single silicon wafer.

The basic manufacturing technique used to imprint wafers is batch processing. A group of silicon wafers is moved through a series of work stations. At each station, the wafers undergo specific imprinting processes before they are moved to the next station. With hundreds of processing stations involved, semiconductor manufacturing is one of the most complex production processes ever adapted to mass production.[33]

As chip complexity and density have increased over the years—with the size of electrical pathways shrinking to the tens of thousandths of a human hair's width—imprinting machinery has also become more complex. Today's equipment employs x-rays, lasers, and electronic beams in addition to the traditional photolithography techniques. Each generation of this equipment, however, presents unique pro-

duction problems in that procedures developed for one generation are usually not applicable to its successor. Techniques, for example, used to adjust photolithography machinery to produce the maximum number of good chips are not useful in adjusting laser machinery.[34]

Besides adjusting machinery to achieve acceptable yield ratios—as mentioned, initial yields are as low as 5 percent or less—the imprinting process also involves adjusting various chemical reactions, such as solvents and reaction times, and maintaining or improving the manufacturing environment as a whole. To minimize the number of defective chips caused by dust particles, for example, imprinting is done in special "clean" rooms in which the air has been purified 100 times cleaner than hospital operating rooms or 10,000 times cleaner than typical office air.[35]

Imprinted wafers are usually air freighted to offshore plants for final assembly and testing work. In these plants, typically owned by the same company that designed and imprinted the chips, each good chip has small wires attached to its edges so it can carry electrical current. The wired chips are then encapsulated into plastic or ceramic cases and shipped back to the parent company for final testing and sale.[36] In recent years, the introduction of automated wiring and encapsulating machinery has made for a return of this assembly work to the United States as the amount of manual labor required has deceased.[37] In the 1970's, for example, a worker could wire about 120 chips per hour, compared to 5,120 per hour using the machinery of the 1980's.

Outlook

While semiconductor output and demand have recovered from the 1985 downturn—with output increasing 1.8 percent in 1986[38]—the long-term outlook for the industry hinges on a number of more fundamental factors than cyclical business movements. The continued development of improved generations of integrated circuits coupled with improvements in manufacturing techniques offers two (not mutually exclusive) paths to follow—the mass production of improved standardized products, such as 4 megabit or larger memory chips and concentration on producing customized chips for individual customers. To confront the challenge of mass production, a consortium of semiconductor companies is constructing a factory to test manufacturing techniques for the latest generations of semiconductor devices.[39] To economically produce customized devices, many companies, especially small startup firms, are focusing their efforts on developing computer-assisted and computer-integrated manufacturing and design processes.[40] For the industry overall, however, the key to continued productivity gains will still mainly lie with the industry's ability to turn laboratory innovations quickly into marketable products—especially considering the wide array of future semiconductor materials and devices currently on the drawing boards, such as superconducting compounds, holographic laser cubes, organic memory devices, silicon micromechanical devices, and three-dimensional quantum well devices.[41] □

———*FOOTNOTES*———

[1] The semiconductor industry is designated as SIC 3674 by the 1982 *Standard Industrial Classification Manual* of the Office of Management and Budget. This industry consists of establishments primarily engaged in manufacturing semiconductors and related solid state devices, such as semiconductor diodes and stacks, including rectifiers, integrated microcircuits (semiconductor networks), transistors, solar cells, and light sensing and emitting semiconductor (solid state) devices.

Average annual rates of change are based on the linear least squares of the logarithms of the index numbers. Extensions of the indexes will appear in the annual Bureau of Labor Statistics bulletin, *Productivity Measures for Selected Industries*.

[2] Andrew Pollack, "Japanese Chip Breakthrough," *The New York Times*, Feb. 5, 1987, p. D6; and Albert J. Blodgeet, Jr., "Microelectronic Packaging," *Scientific American*, July 1983, p. 84.

According to some projections, a billion element chip can be achieved, although limits imposed by fabrication processes may affect the time required to reach this level of density. See James D. Meindl, "Chips for Advanced Computing," *Scientific American*, October 1987, pp. 78–88.

[3] Robert W. Wilson, Peter K. Ashton, and Thomas P. Egan, *Innovation, Competition, and Government Policy in the Semiconductor Industry* (Lexington, MA, Lexington Books, 1980), pp. 86–89; and industry sources.

[4] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, September 1979, pp. 45–48; and industry sources.

[5] W. J. Sanders, *Competitive Factors Influencing World Trade in Semiconductors*, Statement before the Subcommittee on Trade, Committee on Ways and Means, U.S. House of Representatives, Nov. 30, 1979, Serial 96–92, pp. 53–54; and industry sources.

While improvements in manufacturing techniques and processes are the major impetus behind declining unit prices, other factors, such as industry capacity and foreign competition, also play a role. In the early 1980's, for example, semiconductor manufacturers, both foreign and domestic, increased their manufacturing capacity in anticipation of 30- to 50-percent annual sales growth. When this growth did not materialize, the resulting surplus of chips triggered sharp unit price declines even though the preferred capacity utilization rate of domestic manufacturers fell from 83 percent in 1983 to 69 percent in 1985. See Stephan Koepp, "Feeling the Crunch from Foreign Chips," *The Wall Street Journal*, Oct. 27, 1986, pp. 72–73; Michael W. Miller, "Microchip Firms in U.S. Yielding a Major Market," *The Wall Street Journal*, June 5, 1985, p. 34; and, *Survey of Plant Capacity, 1985*, Current Industrial Reports, MQ-C(85)-1 (Bureau of the Census, November 1986), p. 8.

[6] Wilson and others, *Innovation, Competition, and Government Policy in the Semiconductor Industry*, p. 35.

[7] *Ibid*, p. 19; and U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, p. 8.

Although the military's consumption of semiconductor devices is lessening in proportion to that of other users, the Department of Defense still plays a significant role in the development of new technologies and products. Beginning in the early 1960's, when the Air Force funded the development of integrated circuits for the Minuteman missile guidance system, the military has continued to support the semiconductor industry directly through research and development contracts and indirectly through product purchases. In 1979, for example, the Defense Department funded a program to develop very high speed integrated circuits that involved nearly every major semiconductor manufacturer. By 1984, the program was beginning to yield results in the form of improved integrated circuits, manufacturing techniques, and processes. While national security considerations constrain the immediate commercial applications of these advances, they eventually do occur.

See *Aviation Week and Space Technology*, July 30, 1984, "New Circuits Expected to Exceed," pp. 46–51; "Honeywell Plans to Supply Samples

Early Next Year," pp. 52–60; "Hughes Chip Sets Supports Signal Processing Needs," pp. 61–63; "Texas Instruments Seeks Commonality," pp. 64–65; and John Paul Newport, Jr., "A Supercomputer on a Single Chip," *Fortune*, Sept. 29, 1986, pp. 128–29.

[8] Wilton Woods, "How Chipmakers Survive," *Fortune*, Apr. 13, 1987, pp. 89–92; and industry sources.

This breakdown of world market shares does not reflect the production of "captive" semiconductor establishments who manufacture semiconductors mainly for use in-house as contrasted to merchant firms who produce for the general market. In 1981, it was estimated that the combined production of the two largest "captive" producers—AT&T and IBM—amounted to about 25 percent of total semiconductor production as reported by the Department of Commerce. See Wilson and others, *Innovation*, p. 8.

[9] Douglas A. Webbink, *The Semiconductor Industry: A Survey of Structure, Conduct, and Performance*, Staff Report to the Federal Trade Commission, January 1977, pp. 117–19; and industry sources.

[10] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, p. 43; and industry sources.

[11] Industry sources.

[12] Grunwald and Flamm, *The Global Factory* (Washington, The Brookings Institution, 1985), pp. 53–54; and industry sources.

[13] Industry sources.

[14] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, pp. 17–18; Wilson and other others, *Innovation, Competition, and Government Policy in the Semiconductor Industry*, p. 33; and industry sources.

[15] Industry sources.

[16] "Toward the Silicon Foundry," *Scientific American*, February 1983, pp. 82–83; and industry sources.

[17] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, pp. 23–26; "Automated Semiconductor Line Speeds Custom Chip Production," *Electronics*, Jan. 27, 1981, pp. 121–27; and industry sources.

The relatively recent introduction of automated production equipment and processes may seem a bit odd considering the high-tech nature of the industry. The tardiness reflects the past reluctance of the industry to invest in expensive automated assembly lines that would soon be made obsolete by continuing product improvements. During the 1960's, for example, there were many cases of firms' building highly automated facilities only to find them quickly outmoded, in some cases even before completion, because these facilities were not adaptable to producing later generations of semiconductor devices. See Grunwald and Flamm, *Global Factory*, pp. 69–70; and industry sources.

[18] Mark Sieling, *Industry Wage Survey: Semiconductors, September 1977*, Bulletin 2021 (Bureau of Labor Statistics, April 1979).

[19] John A. Alic and Martha C. Harris, "Employment lessons from the electronics industry," *Monthly Labor Review*, February 1986, pp. 32–34.

[20] Wilson and others, *Innovation, Competition, and Government Policy in the Semiconductor Industry*, pp. 13–18; U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, pp. 10–13; and industry sources.

[21] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, p. 19.

[22] John W. Wilson, "U.S. Chipmakers Are Learning to Cope," *Business Week*, Jan. 12, 1987, p. 92; Thomas C. Hayes, "Texas Instruments vs. Japan," *The New York Times*, July 1, 1987, p. D1; and industry sources.

Within the semiconductor industry, there have been occasional attempts to manufacture finished electronic goods which incorporate integrated circuits (vertical integration). In the early 1970's, for example, about 50 large semiconductor firms started to produce personal calculators and watches. By the late 1970's, however, most had abandoned these efforts in the face of declining prices for these products—ironically brought on, in large part, by the declining unit prices of semiconductors devices themselves. (Between 1974 and 1975, average prices for electronic calculators fell from $30 apiece to $6—mainly reflecting lower unit prices for their semiconductor innards.) At the height of this movement by the industry into consumer electronic products (1974), secondary products accounted for about one-fifth of total industry shipments. By 1975, they amounted to only 10 percent.

Very few electronic goods manufacturers, however, have attempted to produce semiconductor devices in the face of relatively large investment requirements and the complex nature of the product. See Wilson and others, *Innovations, Competition, and Government Policy in the Semiconductor Industry*, pp. 25–36, 98–101; and industry sources.

[23] Otis Port, "For Chipmakers, National Boundaries Begin to Blur," *Business Week*, May 6, 1985, p. 110; Peter H. Singer, "The Semiconductor Revolution," *Semiconductor International*, February 1986, p. 86; and industry sources.

[24] Industry sources.

[25] Grunwald and Flamm, *Global Factory*, p. 52; and industry sources.

The swift replacement of semiconductor production machinery also results in a smaller total cumulative working capital investment than is found in most other manufacturing industries whose yearly capital expenditures mainly add to an already large base of relatively long-lived machinery. In 1985, for example, the semiconductor industry produced goods worth $5.82 for each new dollar of capital expenditures while the overall manufacturing sector produced goods worth $27.38.

It is worth noting that innovations in production equipment occasionally led innovations in integrated circuits. For example, polysilicon deposition made metal oxide silicon dynamic random-access memories feasible. See Wilson and others, *Innovation, Competition, and Government Policy in the Semiconductor Industry*, pp. 38–41.

[26] Adjustments for price changes were made by using the implicit deflator for nonresidental investment in structures and producers' durable equipment. See *Economic Report of the President*, January 1987, p. 236.

[27] Grunwald and Flamm, *Global Factory*, pp. 51–53; and industry sources.

In 1976, a million dollars' worth of semiconductor devices required 54 employee years of labor inputs to produce, in contrast to 9 employee years for a similar amount of motor vehicles and 23 employee years for computers.

[28] National Science Foundation, *Science Indicators* (U.S. Government Printing Office, 1979).

[29] Of course, not all inventions springing from the industry's research and development efforts result in successful products or manufacturing innovations. In fact, a large number of such inventions have not been commercially viable. See Wilson and others, *Innovations, Competition, and Government Policy in the Semiconductor Industry*, pp. 56–62; and industry sources.

[30] Robert Neff, "The River Boat Gamblers of the Chip Business," *Business Week*, Dec. 15, 1986, pp. 96–98; "New Service Cuts the Cost of Making Just A Few Chips," *Industry Week*, Sept. 29, 1986, p. 36; and industry sources.

While not matching the gains cited in these articles of between an eight- and tenfold improvement in the costs and time associated with transferring prototypes into devices capable of being mass produced, many semiconductor companies have experienced significant improvements attributable to computer-assisted design techniques.

[31] Industry sources.

[32] Everett M. Rogers and Judith K. Larsen, *Silicon Valley Fever—Growth of High Technology Culture* (New York, Basic Books, 1984), pp. 111–18.

[33] U.S. Department of Commerce, *A Report on the U.S. Semiconductor Industry*, p. 17; and industry sources.

[34] Industry sources.

[35] Rogers and Larsen, *Silicon Valley Fever—Growth of High Technology Culture*, p. 112.

[36] William F. Finan, *The International Transfer of Semiconductor Technology Through U.S.-Based Firms*, Working Paper 118 (Cambridge, MA, National Bureau of Economic Research, December 1975), pp. 18–19; and industry sources.

[37] Steven P. Galante, "U.S. Semiconductor Firms Automate, Cut Chip Production in Southeast Asia," *The Wall Street Journal*, Aug. 21, 1985, p. 28; and industry sources.

[38] Andrew Pollack, "More Chips Expected From Japan Demand Rises in America; Shortage Seen," *The New York Times*, June 22, 1987, p. D1; and David E. Sanger, "U.S. Chip Makers Recovering," *The New York Times*, May 26, 1987, p. D16.

[39] *Defense Semiconductor Dependency*, Report of Defense Science Board Task Force, as excerpted in *Manufacturing Productivity Frontiers*, April 1987, pp. 1–12.

[40] U.S. Department of Commerce, International Trade Administration, *U.S. Industrial Outlook 1987*, January 1987, pp. 32–1—32–6.

[41] Yasar S. Abu-Mostafa and Demetri Psaltis, "Optical Neural Computers," *Scientific American*, March 1987, pp. 88–95; Klaus Bechgaard and Denis Jerome, "Organic Superconductors," July 1982, pp. 72–84; James B. Angell, Stephen C. Terry, and Phillip W. Barth, "Silicon Micromechanical Devices," April 1983, pp. 44–55; and James D. Meindl, "Advanced Computing."

APPENDIX: Measurement techniques and limitations

Indexes of output per employee hour measure changes in the relationship between the output of an industry and employee hours expended on that output. An index of output per employee hour is derived by dividing an index of output by an index of industry employee hours.

The preferred output index for manufacturing industries would be obtained from data on quantities of the various goods produced by the industry, each weighted (multiplied) by the employee hours required to produce one unit of each good in some specified base period. Thus, those goods which require more labor time to produce are given more importance in the index.

In the absence of physical quantity data, the output indexes for the semiconductor industry were constructed using a deflated value technique. The value of shipments of the various product classes was adjusted for price changes by appropriate Producer Price Indexes to derive real output measures. These, in turn, were combined with employee hour weights to derive the overall output measure. These procedures result in a final output index that is conceptually close to the preferred output measure.

The indexes of output per employee hour relate total output to one input—labor time. The indexes do not measure the specific contributions of labor, capital, or any other single factor. Rather, they reflect the joint effect of factors such as changes in technology, capital investment, capacity utilization, plant design and layout, skill and effort of the work force, managerial ability, and labor-management relations.

Productivity trends in the cotton and synthetic broad woven fabrics industry

Expanding output per hour during the 1972–86 period has come about despite low output growth as the industry attempts to modernize and fend off increased import penetration

MARK W. DUMAS AND J. EDWIN HENNEBERGER

Productivity, as measured by output per hour, grew at an average annual rate of 3.7 percent per year from 1972 to 1986 in the cotton and synthetic broad woven fabrics industry.[1] This rate of increase was significantly higher than the 2.5-percent rate for the average of all manufacturing industries. Advances in industry productivity have been aided by substantial investments in capital and diffusion of technological advances such as shuttleless looms. In response to the recent import surge from low-wage foreign competitors, industry modernization and restructuring are taking place as part of an ongoing attempt to sustain productivity growth.

Trends in productivity

The productivity gain of 3.7 percent per year resulted from a rate of growth in output of 0.3 percent and a decline in hours of 3.3 percent. Output fluctuated sharply during the 1972–86 period. Generally, the industry followed the cyclical pattern of the overall economy, with output declines coincident with the economic recessions of 1974–75 and 1980–82. Peak industry output occurred in 1977, prior to the explosive growth in imports. But while the output of the industry has fluctuated, sometimes rather widely, productivity, nonetheless, has, with a few exceptions, continued to advance. In many industries, sharp declines in output result in corresponding declines in productivity. However, this has not been the case with broad wovens, because the industry has been able to adjust the level of the work force in response to the changes in demand. Thus, even though output tumbled in 8 of the past 15 years, productivity fell in only 3.

Productivity trends in this industry can be divided into two distinct periods. From 1972 to 1976, productivity advanced at a relatively slow rate of 1.5 percent annually, as output fell slightly—down 0.2 percent per year, and employee hours declined 1.7 percent annually. In contrast, from 1976 to 1986, productivity expanded at a significantly higher rate—3.8 percent per year. This latter gain in output per hour also reflected output and employee hour declines. From 1976 to 1986, output declined 1.2 percent and hours fell 4.8 percent annually. (See table 1.)

Industry description and operations

The output of this industry consists of woven fabric more than 12 inches in width, made chiefly of cotton or synthetic fibers or both. Important markets for the industry's output are the apparel, automotive, and home furnishings industries. Many plants in the industry are highly integrated and are capable of transforming bales of the fibers, first, into yarn. Multiple strands of this yarn are then interlaced at right angles in the process of weaving. Additionally, an integrated mill would have the capability to "finish" the woven fabric. Finishing, a term for further treating fabric, may involve one or more of the following operations: bleaching,

Mark W. Dumas and J. Edwin Henneberger are economists in the Division of Industry Productivity and Technology Studies, Bureau of Labor Statistics.

dyeing, printing (of a pattern), or applying permanent press treatment. Weavers lacking the capability to perform these finishing operations may contract with commission finishers to provide these services. (However, these contract finishers are *not* part of this study.) Finally, highly integrated mills may fabricate some of their output of finished fabric into end products such as sheets, towels, and pillowcases.

Traditional production techniques

Transforming fibers into finished fabric requires many complex, integrated operations. The fibers must first be "opened"—a loosening and partial cleaning process which "fluffs" up the fibers which were tightly compacted in the shipping bale. "Blending" assures a proper mix of cotton and synthetic fibers. The "picking" operation transforms the blended fibers into loose sheets of lint-like material (lap rolls) made up of roughly parallel fibers. These "laps" are then "carded" to further parallelize the fibers and reduce the sheet of fibers to a loose, rope-like strand. This rope-like material is then put through the "drawing" operation in which several of the strands are merged and their fibers further combed to increase parallelism among the fibers. The "roving" operation then reduces the "drawn" strand into a much smaller strand of fibers, inserts a slight twist, and winds the strands onto "bobbins." Spinning machinery for the final process in the manufacture of yarn draws out the strands of fiber, twists them into yarn, and again winds the yarn onto bobbins.

In the winding and warping operations, yarn is transformed from the relatively small spinning bobbins onto larger packages for use on the weaving looms. Weaving then consists of interlacing crosswise or "filling" threads with lengthwise or "warp" threads on a loom to form fabric. If the yarn that had fed the looms was already colored or "dyed," the fabric is, for the most part, complete. If the yarn was not dyed prior to weaving, the resulting off-white or "grey" fabric may then be dyed in the finishing operation.

Finishing, a series of chemical, mechanical, and inspection techniques, completes the process of cloth manufacture in a fully integrated mill. Many discrete operations such as singeing, washing, bleaching, dyeing, printing, preshrinking, calendering, and others may be included in finishing. It is during these finishing operations that the treatments aimed at improving the "wash and wear" property of cloth are performed.

Technology in the 80's

Technological changes taking place in the industry fall into two general categories. One involves the improvement of conventional machines (in speed, capacity, and degree of automation) and the installation of auxiliary equipment (for machine cleaning and materials handling) to increase productivity and improve product quality. Many of these changes have already been adopted by the larger, modernized mills and are being adopted by smaller mills. The other technological change involves more radical modifications, such as integration of two processes or more, instrumentation for process monitoring, and the marriage of computers to this instrumentation for real-time production information.

While in most mills, yarn is still made on a series of discrete machines, many plants have adopted a continuous opening-blending-carding operation, known as direct-feed or chute-feed carding. This eliminates the handling of fiber from machine to machine and actually eliminates an entire process called picking. In the old system, the picking process rolls the fiber into large heavy "laps" which then must be moved manually or mechanically to the carding machine for the next process. Output with direct-feed carding is about 3 to 4 times greater per hour than the older manual system.

Direct-feed carding greatly reduces the need for unskilled and semiskilled labor, compared to the conventional process of opening, blending, picking, and carding. In this continuous system, no picker operators are required nor are the laborers who move the heavy fiber laps. Without the fiber laps, labor for cleaning and maintenance is also greatly reduced. In addition to being considerably more productive than conventional operations, the direct-feed or chute-feed process has also helped meet Federal requirements for lower cotton dust levels, because the opening-to-carding operations are major areas of cotton dust generation. Moreover, the chute system, it is claimed, improves yarn quality by limiting fiber weight variations.[2]

Spinning, the final step in yarn manufacturing, has been sped up by the introduction of open-end or rotor spinning.

Table 1. Output per employee hour and related indexes for the cotton and synthetic broad woven fabrics industry, 1972–86

[1977=100]

Year	Output per employee hour			Output	Employee hours		
	All employees	Production workers	Nonproduction workers		All employees	Production workers	Nonproduction workers
1972	85.8	85.7	86.7	89.4	104.2	104.3	103.1
1973	76.6	76.5	77.1	80.6	105.2	105.3	104.6
1974	79.2	79.4	78.0	79.7	100.6	100.4	102.2
1975	86.7	87.2	83.0	79.5	91.7	91.2	95.8
1976	86.9	86.8	88.8	89.2	102.6	102.8	100.5
1977	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1978	93.5	93.6	92.6	90.4	96.7	96.6	97.6
1979	100.7	100.5	102.8	97.5	96.8	97.0	94.8
1980	104.9	105.0	104.1	98.0	93.4	93.3	94.1
1981	107.4	108.0	101.0	94.7	88.2	87.7	93.8
1982	112.5	115.5	89.9	81.2	72.2	70.3	90.3
1983	121.6	122.8	112.3	92.2	75.8	75.1	82.1
1984	119.9	120.7	112.5	90.3	75.3	74.8	80.3
1985	123.9	125.0	114.0	82.5	66.6	66.0	72.4
1986	130.3	130.7	128.4	85.5	65.6	65.4	66.6
	Average annual rates of change[1]						
1972–86	3.7	3.8	3.0	0.3	−3.3	−3.4	−2.7
1972–76	1.5	1.6	1.2	−0.2	−1.7	−1.7	−1.4
1976–86	3.8	3.9	2.7	−1.2	−4.8	−4.9	−3.8
1981–86	3.6	3.4	5.6	−1.4	−4.8	−4.6	−6.6

[1]Based on the linear least squares trends of the logarithms of the index numbers.

Conventional ring spinning is a relatively discontinuous operation while the open-end machinery integrates several operations and can produce some of the coarser filling yarns at 4 times or more the speed of ring spinning.[3] Moreover, open-end spinning reduces space, maintenance and cleaning requirements, and downtime. Additionally, automatic doffing machinery can be built onto the new open-end spindles. Because doffing (removal of full bobbins) is one of the most labor-intensive operations in the mills, the successful automation of this process greatly improves productivity.

Most notable among the technological advances in the production of woven fabrics has been the introduction of shuttleless looms. Conventional fly-shuttle looms use a wooden projectile (a shuttle) to carry the filling or crosswise yarn back and forth between the alternating sets of lengthwise or warp threads. The shuttle is "slam" driven from one side of the loom to the other by wooden bars. To move the filling yarn back and forth, the newer shuttleless looms use a variety of techniques and are of several types: Rapier (the largest number in place), missile, water jet (restricted to 100-percent synthetics), and air jet (currently very popular). As an example of the operation, air jet looms weave the cloth by propelling the filling yarn by means of high-pressure streams of air.

Finally, electronic instrumentation and its extensive diffusion is an integral part of the industry's changeover to a more capital-intensive system. Instrumentation systems along with microprocessors are reducing labor requirements for machine operators, maintenance personnel, and unskilled laborers. They are reducing downtime and improving quality, but at the same time are upgrading requirements for skilled repair technicians and electricians. For example, in the dyeing and finishing operation, laser fabric inspection equipment can detect flaws in the grey woven fabric, while color monitoring devices check for dyeing irregularities.

However, many of the productivity gains enjoyed by U.S. mills as a result of installing this new equipment and the advantage this gave domestic manufacturers over imports from developing countries may be only temporary. Much of the new equipment has allowed domestic fabric manufacturers to undercut imports by producing specialty fabrics, thereby partially removing themselves from the low-end, undifferentiated fabric markets. However, because most of this equipment is also available to foreign manufacturers, any competitive advantage that U.S. mills might hold can potentially be quickly eroded. This problem for the U.S. mills is aggravated by the fact that the domestic textile machinery industry is shrinking and, in some respects, nonexistent. The United States, for example, produces none of the shuttleless looms that are revolutionizing weaving.[4]

Employment trends

Total employment in the cotton and synthetic broad woven fabrics industry declined at an average annual rate of 3.1 percent from 1972 to 1986. This decline is significantly greater than the 0.2-percent decline in employment measured in the total manufacturing sector over the same period. Employment in this industry increased from 288,000 in 1972 to 293,000 in 1973, but fell during the recessionary years of 1974 and 1975. An improved economy help to boost employment to a peak of slightly over 293,000 in 1976. Since 1976, however, employment has, with the exception of 1984, declined steadily. Average annual employment, as of 1986, was 185,000. Total employee hours declined, falling at a rate of 3.3 percent, also higher than the 0.2-percent decline registered by the total manufacturing sector. The number of production workers declined at an average annual rate of 3.2 percent. Production worker employment peaked at 264,000 in 1976 and fell thereafter. In 1986, 166,000 production workers were employed.

The proportion of production workers to the total number of employees remained fairly stable over the period. In 1972, this proportion was 90 percent and in 1986 it was 89 percent. Average hourly earnings of production workers in the cotton and synthetic broad woven fabrics industry are lower than those in all manufacturing. In 1972, average hourly earnings in this industry were $2.75, compared to $3.82 for all manufacturing. By 1986, the industry's average of $7.33 was still below the all-manufacturing average of $9.73, although the gap, in percentage terms, had narrowed.

Structural changes and capital spending

The U.S. weaving industry has historically been fragmented and is still characterized by many firms, both large and small. However, between 1972 and 1986, industry structure changed significantly. Competition and Federal regulation led to increased capital expenditures. The industry was also affected by two major recessions which resulted in the closing of less efficient plants and a reduction in the work force of 36 percent. These changes have resulted in a smaller but more competitive industry, operating at a high level of capacity.

One of the factors which led to changes in the industry's structure was its response to increased competition. Domestic competition has been fierce for the better part of the last decade because of somewhat sluggish demand. The recent surge in imports has only intensified this competition.[5] In the low-growth markets in which these firms (both foreign and domestic) compete, expanding market share for one firm generally means a decreased share for others.[6] Despite international agreements to control their growth, imported goods continue to gain market share. The growth in imported, uncut fabric has been accompanied by the influx of fabricated apparel products, resulting in the further shrinkage of the domestic apparel industry. Thus, imported fabric and apparel products now make up nearly one-half of the apparel and apparel fabric market and one-third of the total textile market.[7]

In an effort to remain competitive, domestic firms are modernizing by investing in capital equipment. Industry specialists believe that capital investment will boost U.S. productivity, thereby reducing the price advantage of imports.[8] This price advantage is largely attributable to the differing wage structure between the United States and other nations. U.S. textile wages, for instance, are more than 8 times higher than wage rates in Korea, a country whose textile products are an increasing source of U.S. imports.[9]

Capital expenditures per employee have been increasing in the broad woven fabrics industry. Although expenditure levels have been below the all-manufacturing average (1972–85), capital expenditures per employee have grown substantially since 1972. In fact, over the period 1972–85, current-dollar capital expenditures per employee grew at an average annual rate of 12.2 percent (from $771 in 1972 to $3,817 in 1985). This rate outpaced the all-manufacturing rate of 9.5 percent, with expenditures growing from $1,356 in 1972 to $4,430 in 1985.

A significant portion of these capital outlays has been allocated to safety and health equipment in an effort to meet the standards of the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA). For some operations, particularly those in which dust levels are high, Federal regulations have been difficult to meet without new or overhauled equipment. Although these equipment outlays have been expensive, some industry specialists believe that Federal health and safety regulations have "contributed to the increased pace and intensity of modernization."[10] These expenditures may have a negative short-term effect on the industry because many foreign competitors do not incur such costs. However, the new equipment may "increase worker productivity and manufacturing efficiency, and therefore improve international competitiveness."[11]

Although there has been some dispute regarding the productivity-enhancing effect of the health and safety equipment, spending for it is expected to decline in future years, leaving larger allotments for new and more productive operating equipment.[12] This is especially important in an industry where technological change has caused the rate of machinery turnover to grow more rapidly from year to year.[13]

Tremendous resources are required by those firms that wish to take advantage of these technological changes, and ultimately remain competitive. Larger firms have been in a better financial position to expend the huge sums required for new plant and equipment. The 10 largest firms in the industry accounted for 85 percent of new machinery purchases.[14] These large firms, reaping the benefits of modernization have increased their dominance over smaller firms. This dominance is illustrated by the concentration ratio, which represents the percentage of sales of a given industry accounted for by its largest companies. The weighted concentration ratio of the eight largest firms in the industry rose from 52 percent in 1972 to 58 percent in 1982.

Although spending on new plant and equipment has played a significant role in increasing the domestic industry's competitive stature, it has not been the sole factor. In general, successful firms have adopted more competitive strategies. Some of these strategies have been: identifying emerging market niches which foreign manufacturers might not have the capacity or incentive to supply, cutting response and production times, and stressing a commitment to quality.

Outlook

Textile demand will continue to be heavily reliant on the basic strength of the economy, especially the apparel, automobile, and housing markets. However, demographic changes will also play a major role. For example, the number of persons in the age group 35–54 years old, who typically have rising incomes and high rates of consumption, are a key element in the growth of demand for textile products. In addition, new industrial products are being developed; some of these replace older products, but some involve new applications; for example, soil-stabilizing "geotextiles" that are used in erosion control.

The productivity advances made by the industry to date, will, at a minimum, need to be maintained in the future if the industry is to have a chance at fending off increased market penetration from foreign textile products. Many industry analysts believe that "the only way to alter the international competitive balance is to drastically shorten the production cycle."[15] Thus, fabric manufacturers would be more closely tied to the apparel and other end-use manufacturers and retailers under a "quick-response" system. Consumer retail preference readings, based on bar-coded end products, would be electronically transmitted to apparel and textile manufacturers, which would be able to respond rapidly by shifting production based on those readings. This would avoid the long lead times (now as much as a year or more) between yarn spinning and ultimate fabrication into finished textile end products.[16]

A quick-response system may allow domestic manufacturers to capitalize on the advantages of market proximity and shortened delivery times—even in the face of low-wage foreign competition. Of course, this system would require that the entire chain of production, from yarn spinning to end product fabrication and ultimately retailing, be "wired" into the network. Although several limited quick-response programs have apparently met with success, the organizational effort to expand such a system nationwide, throughout the textile and apparel manufacturing and retailing industries, remains a major hurdle.[17] □

——*FOOTNOTES*——

[1] The cotton and synthetic broad woven fabrics industry includes both SIC 2211 and SIC 2221 (see *Standard Industrial Classification Manual,* 1987 Edition, Office of Management and Budget). Establishments in these industries are primarily engaged in weaving fabrics more than 12 inches in width. Those establishments classified in SIC 2211 weave fabrics that are wholly or chiefly cotton. Fabrics produced by establishments classified in SIC 2221 are composed wholly or chiefly of silk and manmade fibers including glass.

[2] "Special Report: Chute Feeding," *Textile World*, September 1981, pp. 58–81.

[3] *The Impact of Technology on Labor in Four Industries* (Bureau of Labor Statistics, May 1985), p. 2; and "Mills in U.S. Continue O-E Expansion," *American Textiles International,* April 1987, pp. 21–24.

[4] U.S. Congress, Office of Technology Assessment, *The U.S. Textile and Apparel Industry: A Revolution in Progress—Special Report*, OTA-TET-332 (Washington, Government Printing Office, April 1987), p. 5.

[5] National Academy of Engineering and National Research Council, *The Competitive Status of the U.S. Fibers, Textiles, and Apparel Complex: A Study of the Influences of Technology in Determining International Industrial Competitive Advantage* (National Academy Press, August 1985), p. 57.

[6] Office of Technology Assessment, *U.S. Textile and Apparel Industry*, p. 59.

[7] *Ibid.*, pp. 4, 80.

[8] National Academy of Engineering and National Research Council, *Competitive Status of the U.S. Fibers, Textiles, and Apparel Complex*, p. 16.

[9] "Hourly Compensation Costs for Production Workers, Textile Mill Products Manufacturing," (U.S. SIC 22), 26 Countries, 1975–1986 (Bureau of Labor Statistics, September 1987).

[10] Brian Toyne and others, *The U.S. Textile Mill Products Industry: Strategies for the 1980's and Beyond* (University of South Carolina, Center for Industry Policy and Strategy, 1983), pp. 3–12; and Ruth Ruttenberg, *Compliance With the OSHA Cotton Dust Rule, the Role of Productivity Improving Technology*, for Office of Technology Assessment, March 1983, p. 103.

[11] National Academy of Engineering and National Research Council, *Competitive Status of the U.S. Fibers, Textiles, and Apparel Complex*, p. 53.

[12] *Impact of Technology on Labor*, p. 5.

[13] Office of Technology Assessment, *U.S. Textile and Apparel Industry*, p. 95.

[14] *Ibid.*

[15] "Getting Competitive," *National Journal*, June 7, 1986, p. 1363.

[16] *Ibid.*

[17] "Apparel Makers Shift Tactics," *The New York Times*, Sept. 21, 1987, p. D5.

APPENDIX: Measurement techniques and limitations

Indexes of output per employee hour measure changes in the relation between the output of an industry and the employee hours expended on that output. An index of output per employee hour is derived by dividing an index of output by an index of industry employee hours.

The preferred output index for manufacturing industries would be obtained from data on quantities of the various goods produced by the industry, each weighted (multiplied) by the employee hours required to produce one unit of each good in some specified base period. Thus, those goods which require more labor for production are given more importance in the index. Often, however, as an alternative, unit value weights are used when unit labor requirement weights are not available.

Because neither unit labor nor unit value weights are available for all of the industry's products, an alternative technique was used to derive the output index for this industry. Therefore, real output for the industry was estimated by a "deflated" value technique. Changes in price levels were removed from current-dollar values of production by means of appropriate price indexes at various levels of subaggregation for a variety of products in the group. To combine segments of the output index into a total output measure, employee hour weights relating to the individual segments were used, resulting in an output index that is conceptually close to the preferred output measure.

The annual output index series derived from the above discussed deflated value technique was then adjusted (by linear interpolation) to the index levels of the "benchmark" output series. This benchmark series (also utilizing the deflated value technique) incorporates more comprehensive but less frequently collected Economic Census data.

The indexes of output per employee hour relate total output to one input—labor. The indexes do not measure the specific contribution of labor, capital, or any other single factor. Rather, they reflect the joint effects of factors such as changes in technology, capital investment, capacity utilization, plant design and layout, skill and efforts of the work force, managerial ability, and labor-management relations.

The average annual rates of change presented in the text are based on the linear least squares trend of the logarithms of the index numbers. Extensions of the indexes will appear annually in the BLS bulletin, *Productivity Measures for Selected Industries and Government Services.* A technical note describing the methods used to develop the indexes is available from the Office of Productivity and Technology, Division of Industry Productivity and Technology Studies.

An analysis of unemployment and other labor market indicators in 10 countries

Declining unemployment rates in the United States, Canada, and the United Kingdom contrast with record highs in Japan, France, and Italy during 1987; for the first time, employment ratios by sex are analyzed

JOYANNA MOY

Unemployment rates declined in North America, Sweden, and the United Kingdom during 1987, but rose in Japan, France, and Italy and remained historically high in Australia, Germany, and the Netherlands. The United States was the only country among the 10 studied in which jobless rates have fallen below their pre-1980–82 recession levels. During the second quarter of 1987, the U.S. unemployment rate declined markedly, and by December was 5.8 percent—its lowest level in 7 years. (See table 1.)

In 1986, employment increased in all countries studied. Job growth accelerated in North America, Australia, Japan, Germany, and Italy, and resumed in France. In the Netherlands, Sweden, and the United Kingdom, employment growth tapered off. (See table 2.)

Employment continued to increase in all countries studied in 1987, but France and Italy. In France and Italy, the level of jobs was stagnant. Data for 1987 indicate an acceleration of employment growth for the United Kingdom and Sweden, about the same rate of growth as in 1986 for the United States, Canada, and Japan, and slowdowns in job creation for Australia, Germany, and the Netherlands.

This article compares unemployment, employment, and related labor market statistics in the United States and nine foreign industrial nations—Canada, Australia, Japan, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom.[1] It also introduces comparative civilian employment-to-population ratios, by sex, and briefly discusses comparative unemployment rates published by two other organizations—the Organization for Economic Cooperation and Development (OECD) and the Statistical Office of the European Communities (EUROSTAT).

The foreign labor statistics have been adapted where necessary to correspond with U.S. definitions of employment and unemployment.[2] Beginning with 1983, the measures presented here for Germany and the Netherlands reflect revised methods of adjusting their statistics for comparability with U.S. concepts. The new methods lower Germany's unemployment rate by less than one-half of a percentage point, but lower the Dutch rate by about 2 percentage points. This article also presents comparative figures for the United Kingdom; the previous measures related to Great Britain only, which excludes Northern Ireland. A discussion of these changes and other recent revisions in the Australian, Italian, and Swedish labor force surveys is included in the appendix.

Developments in unemployment

Over the last three decades, the relative unemployment rates among the countries studied have changed substantially. In 1960, North American jobless rates were the highest recorded, while rates in France and Germany were the lowest. The difference between the highest and lowest

Joyanna Moy is an economist in the Division of Foreign Labor Statistics, Bureau of Labor Statistics.

Table 1. Civilian unemployment rates, seasonally adjusted, nine countries, 1983–87

Period	United States	Canada	Australia	Japan	France	Germany	Italy[1]	Sweden	United Kingdom
1983 ..	9.6	11.9	10.0	2.7	8.5	7.1	5.9	3.5	11.9
I	10.4	12.4	9.6	2.7	8.4	6.9	5.4	3.3	11.8
II	10.1	12.2	10.2	2.7	8.4	7.2	6.0	3.5	12.0
III ...	9.4	11.7	10.3	2.7	8.5	7.3	5.8	3.6	11.9
IV ...	8.5	11.2	9.7	2.7	8.8	7.2	6.2	3.4	11.8
1984 ..	7.5	11.3	9.0	2.8	9.9	7.4	5.9	3.1	11.7
I	7.9	11.3	9.4	2.8	9.5	7.3	6.0	3.2	11.9
II	7.5	11.4	9.2	2.8	9.8	7.4	5.9	3.1	11.7
III ...	7.4	11.3	8.8	2.8	10.1	7.4	6.1	3.1	11.6
IV ...	7.3	11.1	8.7	2.7	10.4	7.4	5.6	3.0	11.6
1985 ..	7.2	10.5	8.3	2.6	10.4	7.5	6.0	2.8	11.2
I	7.3	11.1	8.6	2.6	10.5	7.5	5.9	3.0	11.4
II	7.3	10.6	8.5	2.6	10.5	7.6	5.8	2.9	11.2
III ...	7.2	10.2	8.1	2.6	10.5	7.5	5.9	2.8	11.1
IV ...	7.1	10.1	7.9	2.8	10.4	7.5	6.1	2.7	11.1
1986 ..	7.0	9.6	8.1	2.8	10.7	7.2	[2]6.3	2.7	11.2
I	7.0	9.7	8.0	2.7	10.5	7.4	6.2	2.8	11.1
II	7.2	9.6	7.8	2.8	10.7	7.3	6.3	2.6	11.2
III ...	7.0	9.7	8.3	2.9	10.8	7.2	6.0	2.6	11.3
IV ...	6.8	9.4	8.4	2.9	10.8	7.1	6.6	2.6	11.2
1987 ..	6.2	8.9	8.1	2.9	11.1	7.2	6.8	[2]1.9	10.3
I	6.6	9.6	8.3	3.0	11.2	7.1	6.7	2.0	11.0
II	6.3	9.1	8.2	3.1	11.2	7.2	6.7	1.9	10.6
III ...	6.0	8.8	8.0	2.8	11.1	7.2	6.8	1.9	10.0
IV ...	5.9	8.2	7.8	2.8	10.8	7.2	7.0	1.7	9.5

[1] Quarterly data are for January, April, July, and October.

[2] Break in series. For Italy, the first-half 1986 rate based on the former series was 6.4 percent. For Sweden, the 1986 rate based on the new series is 2.2 percent.

NOTE: Quarterly figures for France, Germany, Italy, and the United Kingdom are calculated by applying annual adjustment factors to current published data, and therefore should be viewed as only approximate indicators of unemployment under U.S. concepts. Published data for Australia, Canada, Japan, and Sweden require little or no adjustment.

rates was about $5\frac{1}{2}$ percentage points. Fifteen years later, North American jobless rates were still the highest. French and German rates moved up to the middle of the array and Japanese and Swedish rates descended to the bottom. The range between the highest and lowest rates widened to nearly 7 percentage points. In the early 1980's, unemployment rose sharply in most of Western Europe. In the 1985–86 period, France, the Netherlands, and the United Kingdom had jobless rates of about $10\frac{1}{2}$ percent to 11 percent, more than 3 percentage points above the U.S. rate and about 8 percentage points above the rates in Japan and Sweden. Germany's unemployment rate also rose above the U.S. rate.

The recovery from the recessions of the early 1980's began earlier in the United States and Canada than in Western Europe. Joblessness peaked at the end of 1982 in North America, while European unemployment rates continued to rise into, or even through, 1983. The subsequent improvement in North American unemployment rates contrasted with little or no improvement in Western Europe (other than Sweden) and in Japan.

The U.S. unemployment rate has declined substantially since the beginning of 1983, with the largest declines occurring from that year through mid-1984, from more than 10 percent to $7\frac{1}{2}$ percent. The decline tapered off in late 1984 and as of the first half of 1986, the jobless rate was little changed, at 7.1 percent. It was not until the second quarter of 1987 that the unemployment rate again declined markedly. By the fourth quarter, the jobless rate was 5.9 percent.

Unemployment has also moved downward in Canada since the recession peak of 12.8 percent in the fourth quarter of 1982, although not as sharply as in the United States. By January 1986, the jobless rate had fallen below 10 percent for the first time in $3\frac{1}{2}$ years. However, the Canadian jobless rate remained virtually unchanged throughout 1986 and the first quarter of 1987 at about $9\frac{1}{2}$ percent. In the second quarter of 1987, the unemployment rate fell sharply, as in the United States, and by December was 8.1 percent.

In Australia, unemployment fell steadily between the end of 1983 and mid-1986. By that time, the jobless rate had dropped below 8 percent, from the recession high of more than 10 percent recorded in the third quarter of 1983. However, the unemployment rate inched upward to more than 8 percent in the second half of 1986 and remained there during the first half of 1987. During the second half of 1987, the jobless rate began to inch downward and by December was 7.8 percent.

In Sweden and the United Kingdom, unemployment rates have been moving downward since mid-1983. In Sweden, the decline since 1985 is partly attributable to increased early retirements and the introduction of labor market programs aimed specifically at youth.[3] Labor market schemes, such as public relief work, vocational training, and sheltered workshops are used extensively in Sweden to provide jobs to people who would otherwise be unemployed. The number of persons enrolled in these labor market schemes varies with the business cycle, but exceeded the number unemployed for more than a decade. In 1986, enrollments declined for the second consecutive year, to approximately 3.6 percent of the labor force. In 1984, participants accounted for 4.5 percent of the labor force.

In the United Kingdom, the jobless rate moved slowly downward from its mid-1983 peak of 12 percent until it leveled off at about 11 percent 2 years later. At the end of 1986, unemployment rates resumed their downward movement. By December 1987, the jobless rate had dropped to 9.3 percent, the lowest in 7 years.

The German unemployment rate reached a new high of $7\frac{1}{2}$ percent in 1985. At the end of the year, the labor market situation began to improve. Improvement continued throughout 1986, albeit slowly, and by the fourth quarter, the jobless rate had moved downward to 7 percent. During 1987, however, the jobless rate resumed its movement upward, reaching 7.2 percent in the fourth quarter. According to the German Federal Employment Institute, overall unemployment would have been higher if the Institute had not stepped up its training programs for dislocated workers and jobless youth. More than 500,000 persons were covered by the various Institute-sponsored programs.[4]

In contrast to the above countries, unemployment rates reached 30-year highs in Japan, France, and Italy in late

1986 and in 1987. In Japan, the steep rise in the value of the yen contributed to the deteriorating employment situation. The unemployment rate rose to 2.9 percent in mid-1986 and remained at that level until May 1987 when the rate reached a new peak of 3.2 percent. By July, the unemployment rate had fallen back under 3 percent. While low relative to the rates in most countries, 3 percent is high by Japanese standards historically.

Table 2. Civilian labor force, employment, and unemployment, approximating U.S. concepts, 10 countries, 1979–86
[Numbers in thousands]

Year	United States	Canada	Australia	Japan	France	Germany	Italy	Netherlands	Sweden	United Kingdom
Labor force:										
1979	104,962	11,231	6,519	55,210	22,670	26,250	20,850	5,100	4,262	26,350
1980	106,940	11,573	6,693	55,740	22,800	26,520	21,120	5,310	4,312	26,520
1981	108,670	11,904	6,810	56,320	22,930	26,650	21,320	5,520	4,327	26,590
1982	110,204	11,958	6,910	56,980	23,160	26,700	21,410	5,570	4,350	26,740
1983	111,550	12,183	6,997	58,110	23,130	[1]26,650	21,590	[1]5,600	4,369	26,790
1984	113,544	12,399	7,133	58,480	23,290	26,760	21,670	5,620	4,385	27,180
1985	115,461	12,639	7,272	58,820	23,340	26,980	21,800	5,710	4,418	27,370
1986	117,834	12,870	7,562	59,410	23,480	27,180	[1]21,990	5,760	4,437	27,540
Labor force participation rate:[2]										
1979	63.7	63.4	61.6	62.7	57.5	53.3	48.0	49.0	66.6	62.6
1980	63.8	64.1	62.1	62.6	57.2	53.2	48.2	50.2	66.9	62.5
1981	63.9	64.8	61.9	62.6	57.1	52.9	48.3	51.4	66.8	62.2
1982	64.0	64.1	61.7	62.7	57.1	52.6	47.7	51.2	66.8	62.3
1983	64.0	64.4	61.4	63.1	56.6	[1]52.3	47.5	[1]50.9	66.7	62.1
1984	64.4	64.8	61.5	62.7	56.6	52.4	47.3	50.5	66.6	62.6
1985	64.8	65.2	61.8	62.3	56.2	52.6	47.2	50.7	66.9	62.7
1986	65.3	65.7	63.0	62.1	56.2	53.0	[1]47.5	50.8	67.2	62.7
Employment:										
1979	98,824	10,395	6,111	54,040	21,300	25,470	19,930	4,830	4,174	24,940
1980	99,303	10,708	6,284	54,600	21,330	25,750	20,200	4,980	4,226	24,670
1981	100,397	11,006	6,416	55,060	21,200	25,560	20,280	5,010	4,219	23,800
1982	99,526	10,644	6,415	55,620	21,240	25,140	20,250	4,980	4,213	23,710
1983	100,834	10,734	6,300	56,550	21,170	[1]24,750	20,320	[1]4,890	4,218	23,600
1984	105,005	11,000	6,490	56,870	20,980	24,790	20,390	4,930	4,249	24,000
1985	107,150	11,311	6,670	57,260	20,900	24,950	20,490	5,110	4,293	24,310
1986	109,597	11,634	6,952	57,740	20,970	25,210	[1]20,610	5,200	4,319	24,450
Employment-population ratio:[3]										
1979	59.9	58.7	57.8	61.4	54.0	51.7	45.9	46.4	65.3	59.2
1980	59.2	59.3	58.3	61.3	53.5	51.7	46.1	47.0	65.6	58.1
1981	59.0	59.9	58.4	61.2	52.8	50.8	45.9	46.6	65.1	55.7
1982	57.8	57.0	57.3	61.2	52.3	49.6	45.2	45.8	64.7	55.3
1983	57.9	56.7	55.3	61.4	51.8	[1]48.6	44.7	[1]44.5	64.4	54.7
1984	59.5	57.4	56.0	61.0	51.0	48.5	44.5	44.3	64.5	55.3
1985	60.1	58.4	56.6	60.6	50.4	48.7	44.4	45.4	65.0	55.7
1986	60.7	59.4	57.9	60.4	50.2	49.1	[1]44.6	45.9	65.4	55.7
Unemployment:										
1979	6,137	836	408	1,170	1,370	780	920	270	88	1,420
1980	7,637	865	409	1,140	1,470	770	920	330	86	1,850
1981	8,273	898	394	1,260	1,730	1,090	1,040	510	108	2,790
1982	10,678	1,314	495	1,360	1,920	1,560	1,160	590	137	3,030
1983	10,717	1,448	697	1,560	1,960	[1]1,900	1,270	[1]710	151	3,190
1984	8,539	1,399	642	1,610	2,310	1,970	1,280	690	136	3,180
1985	8,312	1,328	602	1,560	2,440	2,030	1,310	600	125	3,060
1986	8,237	1,236	610	1,670	2,510	1,970	[1]1,380	560	118	3,090
Unemployment rate:										
1979	5.8	7.4	6.3	2.1	6.0	3.0	4.4	5.3	2.1	5.4
1980	7.1	7.5	6.1	2.0	6.4	2.9	4.4	6.2	2.0	7.0
1981	7.6	7.5	5.8	2.2	7.5	4.1	4.9	9.2	2.5	10.5
1982	9.7	11.0	7.2	2.4	8.3	5.8	5.4	10.6	3.1	11.3
1983	9.6	11.9	10.0	2.7	8.5	[1]7.1	5.9	[1]12.7	3.5	11.9
1984	7.5	11.3	9.0	2.8	9.9	7.4	5.9	12.3	3.1	11.7
1985	7.2	10.5	8.3	2.6	10.4	7.5	6.0	10.5	2.8	11.2
1986	7.0	9.6	8.1	2.8	10.7	7.2	[1]6.3	9.7	2.7	11.2
Unemployment rate (as published):										
1979	5.8	7.4	6.3	2.1	6.0	3.8	7.7	5.1	2.1	5.3
1980	7.1	7.5	6.1	2.0	6.4	3.8	7.6	5.9	2.0	6.8
1981	7.6	7.5	5.8	2.2	7.5	5.5	8.4	9.1	2.5	10.4
1982	9.7	11.0	7.2	2.4	8.3	7.5	9.1	12.6	3.1	10.9
1983	9.6	11.9	10.0	2.6	8.5	9.1	9.9	17.1	3.5	11.6
1984	7.5	11.3	9.0	2.7	9.9	9.1	10.4	17.2	3.1	11.7
1985	7.2	10.5	8.3	2.6	10.5	9.3	10.6	15.9	2.8	11.9
1986	7.0	9.6	8.1	2.8	10.7	9.0	11.1	14.6	2.7	11.9

[1] Break in series. Based on the former series, the adjusted unemployment rate would be approximately 0.3 percentage point higher for Germany, 0.2 percentage point higher for Italy, and 2 percentage points higher for the Netherlands.

[2] Civilian labor force as a percent of the civilian working age population.

[3] Civilian employment as a percent of the civilian working age population.

Table 3. Civilian unemployment rates, by sex, 10 countries, selected years, 1970–86

Year	United States	Canada	Australia	Japan	France	Germany	Italy	Netherlands	Sweden	United Kingdom
Men:										
1970	4.4	5.6	1.1	1.2	1.4	.5	2.5	(1)	1.4	3.5
1975	7.9	6.2	3.8	1.8	2.9	3.3	2.5	4.0	1.4	5.0
1979	5.1	6.6	5.2	1.9	4.3	2.3	3.0	3.7	1.9	5.6
1980	6.9	6.9	5.1	1.7	4.4	2.3	2.9	4.4	1.7	7.4
1981	7.4	7.0	4.8	2.0	5.5	3.4	3.3	7.0	2.4	11.5
1982	9.9	11.1	6.4	2.1	6.2	5.2	3.8	9.0	3.0	11.5
1983	9.9	12.1	9.7	2.5	6.6	[2]6.4	4.1	[2]11.4	3.4	12.1
1984	7.4	11.2	8.7	2.5	8.0	6.4	4.2	10.9	3.0	11.9
1985	7.0	10.3	8.0	2.4	8.7	6.4	4.3	9.2	2.8	11.5
1986	6.9	9.4	7.7	2.4	8.9	5.9	[2]4.4	(1)	2.6	11.6
Women:										
1970	5.9	5.8	2.8	2.2	4.1	.6	5.2	(1)	1.7	2.3
1975	9.3	8.1	7.0	3.9	6.2	3.6	5.8	8.3	2.0	4.0
1979	6.8	8.8	8.2	4.1	8.6	4.1	7.3	9.1	2.3	5.0
1980	7.4	8.4	7.9	3.3	9.4	3.8	7.4	10.1	2.3	6.3
1981	7.9	8.3	7.4	3.5	10.5	5.1	8.1	13.7	2.7	9.0
1982	9.4	10.9	8.5	3.5	11.2	6.9	8.6	13.7	3.4	11.1
1983	9.2	11.6	10.4	3.7	11.1	[2]8.3	9.4	[2]15.2	3.5	11.6
1984	7.6	11.3	9.5	3.3	12.6	8.9	9.4	14.4	3.2	11.3
1985	7.4	10.7	8.8	3.1	12.9	9.2	9.4	13.0	2.9	10.7
1986	7.1	9.9	8.7	3.3	13.1	9.2	[2]9.8	(1)	2.7	10.7

[1] Not available.

[2] Break in series.

In France, the jobless rate rose to $10\frac{1}{2}$ percent in early 1985 and remained at that level for a year. However, by the second quarter of 1986, unemployment resumed its upward movement and reached a new peak of more than 11 percent during the first three quarters of 1987. In response to the deteriorating labor market situation, the French government introduced several programs during 1986 aimed at reducing structural rigidities—simplifying regulations pertaining to layoffs, allowing nongovernment organizations to make job placements, reducing restrictions on fixed-term, temporary, and part-time employment contracts, and expanding job creation and training programs.[5]

The Italian jobless rate, which declined below 6 percent in 1984, has generally risen since early 1985. By the fourth quarter of 1987, it reached 7 percent. However, in addition to a slowly rising unemployment rate, there are a significant number of Italians who would like to work but who are not currently seeking work and who are excluded from the BLS-adjusted unemployment statistics. Nearly one-half of the workers classified as unemployed by the Italian authorities have been reclassified by BLS as discouraged workers.

Although quarterly jobless rates approximating U.S. concepts are not available for the Netherlands, the seasonally adjusted registered unemployment rate provides an indicator of recent trends. This rate, approximately 5 percentage points higher than the BLS-adjusted rate in recent years, has generally declined since December 1983. By early 1987, it had fallen about 4 percentage points, from a high of 17 percent.

Unemployment rates by sex. The historical relationship of higher jobless rates among women was maintained in 1985 and 1986 in all countries studied except the United Kingdom, where rates for men have been traditionally higher. (See table 3.) The ratio of female-to-male unemployment rates remained widest in Italy, where the ratio was greater than 2. In Japan, France, Germany, and the Netherlands, the ratio was 1.5, whereas in the United States, Canada, Australia, and Sweden, the rates for women were only slightly above those for men.

Since 1970, the ratio of female-to-male unemployment rates has narrowed in every country studied, except in Germany and Italy. By 1986, the differential in the United States, Canada, and Sweden had virtually disappeared. In the United Kingdom, the reverse differential has narrowed.

Unemployment rates by age. Since 1983, unemployment rates among youth (persons under age 25) have been at least double the rate of persons 25 years and older in most countries studied. (See table 4.) In North America, Australia, Germany, Sweden, and the United Kingdom, youth jobless rates have declined since 1983; in Japan and Italy, they have risen. In the United Kingdom, the youth unemployment rate declined between 1983 and 1985, but rose slightly in 1986. The French youth unemployment rate rose between 1983 and 1985, but fell in 1986. Programs aimed at providing jobs for youth, especially teenagers, have contributed to the decline or abated the increase in Western Europe. In addition, demographic pressures have eased as the supply of youth entering the labor market has declined. In 1986, rising unemployment rates in France and Germany for workers 25 and over, accompanied the declining youth jobless rates, suggesting that the special measures may have partly shifted the burden of unemployment.[6]

In general, unemployment rates among teenagers remained considerably higher than among young adults (age 20–24 years). In Japan, France, and Italy, teenage unemployment rates reached new highs during 1985. By 1986, teenage unemployment rates were declining in all but Japan and the United Kingdom, and most likely, Italy. The 1986 adjusted teenage unemployment rate for Italy was not available; however, given that the published youth rate rose, it is likely that the teenage rate also rose. In contrast, since 1984, the unemployment rate for Swedish teenagers has fallen well below the rate for young adults. Employment in the Youth Teams program has substantially reduced unemployment among 18- and 19-year-olds.[7]

Employment trends

Employment increased more rapidly in North America and Australia than in Japan and Western Europe in 1985–87. In the United States, job creation has continued unabated since the end of 1982, although it has slowed in recent years. The employment growth rates for 1985 (2 percent) and 1986 (2.3 percent) were less than half the 1984 rate. About 4.6 million jobs were created between 1984 and 1986. During the course of 1987, an additional 3.1 million jobs were created—the largest annual gain since 1984. In contrast, aggregate employment in the six Western European nations studied rose by only 1.4 million between 1984 and 1986, and by about 700,000 in 1987. (The aggregate population of these six countries slightly exceeds that of the United States.) The contrast between the North American and European experience in generating jobs is not a new phenomenon. Since 1979, more than 15 million jobs were created in North America, while the six Western European countries experienced a net gain of 810,000 jobs. Canadian job creation rates lagged behind those of the United States during the early 1980's. By 1985, the Canadian employment growth rate was once again stronger than in the United States, but in 1987, the U.S. growth rate was stronger.

In Australia, employment has expanded vigorously since 1984. Employment growth rose from 3 percent in 1984 and 2.8 percent in 1985 to 4.2 percent in 1986. In 1987, employment continued to expand, at 2.2 percent.

Japan is the only country studied where employment has risen continuously since 1980. In 1985 and 1986, the number of jobs created totaled nearly 1 million. During 1987, employment continued to expand and 580,000 jobs were created. Japan's population is about half that of the United States.

In Western Europe, employment gains were recorded in 1985 through 1987, except in France and Italy. Although French employment rose slowly throughout 1985, the increase was not sufficient to offset the previous year's loss. A small gain was recorded in France in 1986, but jobs were stagnant in 1987. In Italy, employment increased in both 1985 and 1986, but stabilized during 1987. In the Netherlands, Sweden, and the United Kingdom, the job creation rate in 1986 was less than in 1985. However, job growth in Sweden and the United Kingdom accelerated in 1987, while in the Netherlands, it probably decelerated.[8] In Germany, 1986 was a better year for job creation than 1985, but 1987 saw a tapering off of growth. The following tabulation shows the percent change in employment from the previous

Table 4. Civilian unemployment rates, by age, nine countries, 1983–86

Age group	United States	Canada	Australia	Japan	France[1]	Germany[1]	Italy	Sweden	United Kingdom[1]
1983									
All working ages	9.6	11.9	10.0	2.7	8.0	6.5	5.9	3.5	[2] 11.6
Under 25 years	17.2	19.9	18.3	4.6	21.2	10.8	21.4	8.2	[2] 20.0
Teenagers[3]	22.4	22.2	23.6	6.4	30.7	11.7	29.6	10.6	[2] 22.1
20–24 years	14.5	18.5	14.5	4.1	18.8	10.2	17.4	7.0	[2] 18.3
25 years and over	7.5	9.4	7.0	2.4	5.8	5.5	2.8	2.6	[2] 9.2
1984									
All working ages	7.5	11.3	9.0	2.8	9.6	6.7	5.9	3.1	11.8
Under 25 years	14.0	17.9	16.8	5.0	26.2	10.5	21.9	6.1	19.7
Teenagers[3]	18.9	19.9	22.3	7.0	37.8	11.6	29.8	5.0	22.3
20–24 years	11.5	16.8	12.9	4.4	23.6	9.8	17.9	6.7	17.9
25 years and over	5.8	9.3	6.3	2.4	6.7	5.8	2.8	2.6	9.5
1985									
All working ages	7.2	10.5	8.3	2.6	10.3	6.9	6.0	2.8	11.2
Under 25 years	13.6	16.5	15.2	4.8	27.6	10.0	22.1	5.8	17.7
Teenagers[3]	18.6	18.8	20.3	7.5	36.6	10.6	30.4	4.6	19.8
20–24 years	11.1	15.3	11.5	4.2	25.6	9.6	18.3	6.4	16.4
25 years and over	5.6	8.7	5.9	2.3	7.5	6.2	2.9	2.3	9.3
1986									
All working ages	7.0	9.6	8.1	2.8	10.3	[4]	[4]	2.7	11.2
Under 25 years	13.3	15.2	15.1	5.2	25.3	[4]	[4]	5.7	18.0
Teenagers[3]	18.3	16.8	20.2	7.5	31.3	[4]	[4]	4.4	20.1
20–24 years	10.7	14.3	11.2	4.6	24.0	[4]	[4]	6.3	16.7
25 years and over	5.4	8.0	5.7	2.5	7.9	[4]	[4]	2.1	9.2

[1] French data are for March; German data are for June; and U.K. data for 1984 onward are for April-June.
[2] Data exclude Northern Ireland and are not adjusted to U.S. concepts.
[3] 16- to 19-year-olds in the United States, France, Sweden, and the United Kingdom; 15- to 19-year-olds in Canada, Australia, and Japan; and 14- to 19-year-olds in Germany and Italy.
[4] Not available.

year for 1985–87 (note: 1987 data are preliminary for Europe, and Dutch data for that year are estimated by the OECD):

	1985	*1986*	*1987*
United States	2.0	2.3	2.6
Six European countries	.7	.7	.7
France	−.4	.3	0
Germany	.6	1.0	.6
Italy	.5	.6	−.1
Netherlands	3.7	1.8	.8
Sweden	1.0	.6	1.6
United Kingdom	1.3	.6	1.9

Full-time versus part-time employment. In addition to the differences in employment growth rates noted above, the importance of full-time and part-time employment varies widely. In North America, employment growth has consisted primarily of full-time jobs, while in Europe and Australia, growth in part-time jobs has been more marked. According to the OECD, nearly three-fourths of the 12 million net new jobs created in North America between 1979 and 1986 were full-time positions, in sharp contrast with Europe where the number of full-time jobs between 1979–85 remained virtually unchanged.[9]

In the United States, of the 4.6 million jobs created between 1984 and 1986, 4 million were full-time positions. However, in 1986 and 1987, the growth rate of persons voluntarily working part-time schedules was higher than that for those on full-time schedules. In Canada, the number of full-time jobs increased steadily between 1984 and 1986, although their proportion of civilian employment has declined somewhat. The share of part-time jobs to overall employment has increased since 1980.

In Japan, the number of regular full-time employees has continued to increase while the number of new temporary and part-time employees hired has tapered off since 1983. A significant and rising proportion of these temporary and part-time workers are women (68 percent in 1986). Japanese firms prefer to hire women as temporary or part-time workers because of their tendency to withdraw from the labor market for marriage and child rearing and to return when their children begin school. In addition, under the Japanese income tax system, it is sometimes more advantageous for a married woman to work part time rather than full time.[10]

In Australia, the growth rate in part-time employment outpaced the growth rate in full-time employment. In 1986, the number of part-time jobs created (116,000) accounted for 40 percent of all the new jobs created. In 1985, part-time jobs rose by 55,000 and accounted for about 30 percent of all new jobs.

Economic part time. In 1985 and 1986, as the employment situation improved, the number of persons who were involuntarily working part time declined in all countries for which data are available.

In Western Europe and Japan, workers placed on part-time schedules for economic reasons are provided payments to compensate for hours lost. In the United States and Canada, such payments are not widespread.

In Western Europe, data on such workers are available for France, Germany, Italy, and the Netherlands and are derived from administrative records relating to payments for work time lost because of economic reasons. In North America, the source of the data on involuntary part-time work is the labor force survey and the statistics contain a component of underutilization not covered in the administrative statistics—persons working part time because they could not find full-time jobs.

In France, the number of persons compensated for working shorter hours fell in 1985 by 77,000 and in 1986 by 68,000 to 128,500 (0.6 percent of civilian employment). The number of days not worked declined by 40 percent between 1984 and 1986 to 8.9 million. At its peak in 1981, more than 320,000 French workers (1.6 percent of civilian employment) were compensated for 17.4 million days lost.

In Germany, the number of persons who experienced reductions in their workweek and received short-time benefits fell by 40 percent in 1985 to about one-third the 1983 peak of 675,000 persons. In 1986, short-time benefit recipients declined 17 percent to 195,000, approximately 0.8 percent of civilian employment.

In Italy, the Wage Supplement Fund paid for 660 million hours not worked in 1985, nearly 100 million hours less than the 1984 peak. In 1986, the number of hours subsidized declined 10 percent to 595 million hours, approximately equivalent to 330,000 person years of work.

In the Netherlands, the number of persons for whom permits for short-time work have been issued declined 85 percent in 1985. According to the Dutch, an equivalent of 1,800 person years of work were lost in 1984 and only 300 person years in 1985. In 1986, the number of permits issued fell 13 percent with a loss of 300 person years of work.[11]

In the United States, data are available from the Current Population Survey on the number of persons working part time for economic reasons. This group comprises persons working reduced hours for economic reasons and persons working part time because they could not find full-time work. The number peaked at 6.3 million in 1983 and has since declined but at a progressively slower pace. In 1986, 5.6 million workers, approximately 5.1 percent of the employed, were affected. The proportion of persons on reduced work schedules held steady at 2.3 percent of employment in 1984 and 1985 and declined to 2.2 percent in 1986. Persons working part time because they could only find part-time jobs continued the decline begun in 1984. In 1985 and 1986, 2.6 percent of all civilian workers were unable to find full-time jobs.

In Canada, the number of persons involuntarily working at regular part-time jobs continued to rise until 1986. Between 1975 and 1985, the number of these part-time work-

ers increased fivefold; between 1980 and 1985, the number more than doubled. In 1985 and 1986, more than 500,000 part-timers, about $4\frac{1}{2}$ percent of civilian employment, wanted to work full time but were unable to find a full-time job.

The Canadian labor force survey also collects data on the number of employed persons who lost work time because of layoff or reduced hours. The number of such persons declined one-fifth in 1983 and more moderately in 1984 and 1985. In 1986, the number remained unchanged. The ratio of persons on this type of reduced work schedule inched downward from 1.1 percent of civilian employment in 1983 to 0.8 percent in 1985 and 1986.

Employment ratios by sex

Employment-to-population ratios are another indicator of how well a country's economy provides jobs for its workers. Over the long term, employment ratios are influenced by structural factors such as additional years of schooling, early retirement, and the rising participation of women. Over the short term, changes in business activity also affect the movement of the ratio.

Table 5 and chart 1 present employment-population ratios by sex adjusted to U.S. concepts for 10 countries. Data are shown by sex because the overall trend masks marked differences in the trends for men and women. Employment-to-population ratios for men declined in all countries between 1960 and 1986. The largest declines occurred in Western Europe. Male employment ratios fell from 83 to 62 percent in France and from 82 to 64 percent in Germany. British and Italian men also recorded large declines in their employment ratios. The smallest declines, less than 10 percentage points, occurred in North America and Japan.

In 1986, male employment ratios were highest in Japan (75 percent) followed by the United States, Canada, Australia, and Sweden (about 70 percent) and lowest in France, Italy, and the Netherlands (about 62 percent). In 1960, male employment ratios were lower in the United States and Canada than in Western Europe and Japan. The range between the highest and the lowest ratio was much narrower, 8 percentage points, compared to 14 percentage points in 1986.

The general downward movement of male employment ratios reflects the long-term trends of increased years of education and earlier retirements. In many Western European nations, retirement ages have been lowered in response to continued high unemployment rates. The ratio is also affected by changes in the age distribution of the population. In the six Western European nations studied, the proportion of their combined populations age 65 and over increased from 12 percent of the total population in 1970 to 14 percent in 1980. In 1985, the proportion remained at about 14 percent. In contrast, in the United States, where the total population is a little smaller than the combined European population, the ratio is lower. The proportion age 65 and over rose steadily from 10 percent in 1970 to 12 percent in 1985. In Japan, the ratio is still lower but rising—7 percent in 1970 and 10 percent in 1985.

In the Netherlands, the low and falling employment-population ratio is associated with a rise in both disability pensions and early retirement programs, which have encouraged withdrawal from the labor force.[12] In Italy, the existence of a large underground economy may be an important factor which helps to explain its low ratio. Many Italians are engaged in unrecorded employment; according to the OECD, some are officially classified as not in the labor force while others are classified as unemployed.[13]

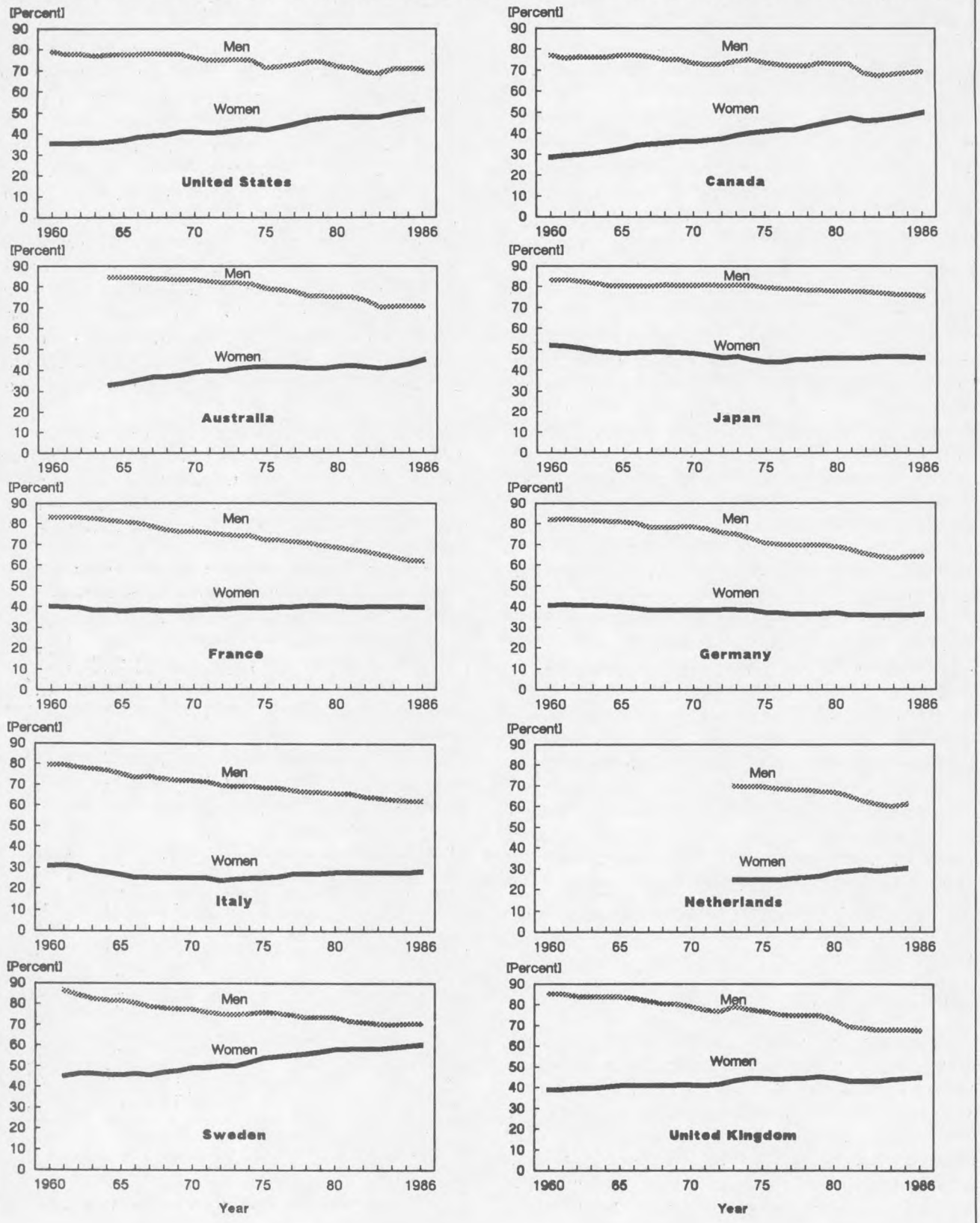
Trends in employment ratios were more varied among women than among men. Female employment ratios have generally moved upward from the early 1960's in North America, Australia, Sweden, and the United Kingdom. In Japan, France, and Italy, they initially fell, but subsequently turned upward. In France, the rise began in the early 1970's. In Japan and Italy, the rise began in the mid-1970's. The

Table 5. Civilian employment-population ratios by sex, 10 countries, selected years, 1960–86

Year	United States	Canada	Australia	Japan	France	Germany	Italy	Netherlands	Sweden	United Kingdom
Men:										
1960	78.9	76.9	(1)	82.8	83.4	82.0	79.5	(1)	(1)	85.0
1965	77.5	76.9	84.4	80.2	80.9	80.7	75.2	(1)	81.5	83.5
1970	76.2	73.4	83.2	80.5	76.4	78.3	71.9	(1)	77.4	79.2
1975	71.7	73.5	79.1	79.5	72.2	70.6	68.8	69.4	76.0	76.7
1980	72.0	73.0	75.1	77.9	68.6	68.9	66.0	66.8	73.6	72.8
1985	70.9	68.7	70.6	75.9	62.2	63.7	62.5	61.0	70.5	68.0
1986	71.0	69.5	70.9	75.4	62.0	64.1	62.2	(1)	70.6	67.5
Women:										
1960	35.5	28.6	(1)	51.8	40.0	40.5	31.0	(1)	(1)	38.9
1965	37.1	32.6	34.0	48.1	37.9	39.9	26.6	(1)	45.8	40.8
1970	40.8	36.1	39.3	48.2	38.0	38.2	25.0	(1)	49.1	41.2
1975	42.0	40.8	41.4	44.0	39.1	37.0	25.3	24.5	54.0	44.4
1980	47.7	46.2	41.9	45.7	40.0	36.7	27.9	28.0	58.0	44.8
1985	50.4	48.5	43.0	46.3	39.7	35.5	27.8	30.2	59.7	44.4
1986	51.4	49.7	45.1	46.2	39.6	36.0	28.3	(1)	60.4	44.9

[1] Not available.

Chart 1. Civilian employment-population ratios of men and women, 10 countries, 1960-86



Netherlands also shows an increase since the mid-1970's. In Germany, the ratio trended downward until the mid-1980's, but now may be rising. The range between the highest and lowest ratios also widened between 1960 and 1986. In 1960, the range was about 20 percentage points. By 1986, the range had widened to more than 30 percentage points.

In 1986, Swedish women had by far the highest employment ratio, 60 percent, more than double the 28 percent for Italian women and double the rate for Dutch women. In Italy, employment in the underground economy may also partially explain the very low ratios recorded by Italian women. Employment ratios of 45–50 percent were recorded in North America, Australia, Japan, and the United Kingdom. France and Germany had lower ratios, at 40 percent and 36 percent, respectively.

The varied trends in female employment ratios partially reflect the changing sectoral composition of employment. Female employment ratios initially declined, as employment shifted out of the agricultural sector into the goods-producing sector. Many women who worked on family farms withdrew from the labor market when they moved to the city. In 1960, about 10 percent of employed civilians in North America, the Netherlands, and the United Kingdom worked in the agricultural sector, while in the other countries studied, the proportion ranged from 15 percent (Germany and Sweden) to 30 percent (Japan and Italy). By 1986, the proportions had declined in all countries, to about 3 percent in the United States and the United Kingdom; 5 percent in Canada, Australia, Germany, the Netherlands, and Sweden; and slightly under 10 percent in Japan, France, and Italy.

As these countries moved from goods-producing to more service-oriented societies, female employment increased. Accompanying this rise was an increase in the number of part-time jobs, the majority of which are concentrated in the service sector. In Europe, women account for at least 80 percent of part-time jobholders, except in Italy, where the share is about 60 percent. In North America, approximately 70 percent of part-time workers are women. Other reasons contributing to the rise in female employment ratios include declining fertility rates and changing attitudes towards women in the workplace.

Other internationally comparable series

Three organizations compile internationally comparable series of unemployment rates for selected industrial nations. The BLS series, discussed in this article, adjusts unemployment rates to U.S. definitions of employment and unemployment for nine foreign nations. The Paris-based OECD publishes Standardized Unemployment Rates for 16 of its member countries.[14] The Standardized Unemployment Rates are adjusted to International Labor Office (ILO) concepts which are more general than U.S. concepts.

A third organization, EUROSTAT, publishes comparable unemployment rates for European Community countries based on its own specific interpretation of ILO concepts. These concepts are close to U.S. concepts, but there are some differences. (See appendix.) The EUROSTAT rates are fundamentally different from those calculated by BLS and OECD in that they are based on a European Community-wide survey which uses common concepts and definitions, although the wording and ordering of questions vary from country to country.[15] In addition, the data are centrally processed and tabulated by EUROSTAT. In contrast, the BLS and the OECD series are primarily based on data collected in national surveys using national concepts and definitions. The data are processed by their respective statistical agencies and are then adjusted by BLS and the OECD to a common statistical base. However, for Germany and the Netherlands, BLS now uses EUROSTAT statistics to provide benchmarks from 1983 onward. (See appendix.) The OECD has also begun to use the EUROSTAT data for a number of countries.

Table 6 compares the adjusted unemployment rates prepared by these three organizations for 1983 to 1986. There are some differences in the rates published by each organization. The BLS calculates its adjusted jobless rates on both a total labor force base and a civilian labor force base. The

Table 6. Comparative unemployment rates, selected countries, 1983–86

Country	BLS series		OECD Standardized Unemployment Rates total basis	EUROSTAT spring survey civilian basis[1]
	Civilian basis	Total basis		
1983				
France	8.5	8.3	8.3	7.9
Germany	7.1	7.0	8.0	6.4
Italy	5.9	5.8	9.8	8.7
Netherlands	12.7	12.4	12.0	11.9
United Kingdom	11.9	11.8	12.5	11.1
1984				
France	9.9	9.7	9.7	9.5
Germany	7.4	7.2	[2]7.0	6.7
Italy	5.9	5.8	10.2	9.8
Netherlands	12.3	12.0	11.8	12.4
United Kingdom	11.7	11.6	[2]11.7	10.9
1985				
France	10.4	10.2	10.1	10.3
Germany	7.5	7.4	7.2	6.9
Italy	6.0	5.9	10.5	9.2
Netherlands	10.5	10.3	10.6	10.5
United Kingdom	11.2	11.1	11.2	11.5
1986				
France	10.7	10.4	10.3	10.2
Germany	7.2	7.1	7.0	[3]
Italy	6.3	6.2	[3]	10.6
Netherlands	9.7	9.5	9.9	[3]
United Kingdom	11.2	11.2	11.1	11.5

[1] Excludes conscripts but includes career military.

[2] Break in series.

[3] Not available.

NOTE: BLS and OECD data are annual averages; EUROSTAT data relate to varying dates in the spring of each year.

Standardized Unemployment Rates relate to the total labor force while the EUROSTAT data exclude military conscripts, but include the career military. The reference period for the BLS and the OECD series is an annual average while the EUROSTAT data relate to various dates each spring.

Another reason for the differences between the BLS and OECD series is that BLS calculates adjustment factors by sex while the OECD does not. Differences in the age limits also affect the data. The lower age limit of the BLS and the OECD data varies from ages 14 to 16. The EUROSTAT data relate to persons age 14 and over for all countries.

With the exception of Italy, the three different series are moving closer together. In the case of Italy, BLS excludes from the unemployed all those who have not sought work within the past month. The OECD Standardized Unemployment Rates did not make this adjustment; therefore, the Standardized Unemployment Rates have been higher than the BLS figures for Italy. The OECD has now suspended its calculation of Standardized Unemployment Rates for Italy until further information becomes available. The EUROSTAT series requires the registered unemployed to state they are seeking work and are currently available. However, they are not necessarily required to have been seeking work in the past 4 weeks. (Unemployed persons not registered are required to seek work in the past 4 weeks.) The BLS comparative estimates for Italy currently exclude a large number of registrants who did not state that they sought work in the past month. Recent changes in the Italian survey questionnaire will provide additional data on jobseeking activities of the unemployed. BLS will reconsider its adjustment procedure for Italy when the results of the new questionnaire become available. □

—— FOOTNOTES ——

[1] Historical data are available upon request. Selected historical data appear in the Current Labor Statistics section of the *Review*.

[2] For further information, see *International Comparisons of Unemployment*, Bulletin 1979 (Bureau of Labor Statistics, 1978), appendix B; and Supplements to Bulletin 1979 (Bureau of Labor Statistics), appendix B. For some countries, annual adjustment factors are based on data from previous household surveys or provisional data from current household surveys. Therefore, data are preliminary for the United Kingdom from 1982 onward, for Italy from 1984 onward, for Germany from 1985 onward, and for Australia and Sweden from 1986 onward.

[3] National Institute of Economic Research, *The Swedish Economy* (Stockholm, National Institute of Economic Research, 1986), p. 50.

[4] U.S. Embassy's (Bonn) summary of the German Federal Employment Institute President Heinrich Franke's press conference, October 1987.

[5] U.S. Embassy (Paris), "Structural Changes in the French Labor Market Under the Conservatives and Economic Implications," Mar. 10, 1987, p. 1.

[6] Organization for Economic Cooperation and Development, *Economic Outlook*, June 1987, p. 29.

[7] Bjorn Jonzon, "The Statistical Treatment of Persons Affected by Labour Market Measures and Employment and Training Schemes in Sweden," December 1985, p. 33.

[8] *Economic Outlook*, p. 28.

[9] *Ibid.*, p. 32.

[10] U.S. Embassy (Tokyo), *Annual Labor Report 1986*, Apr. 17, 1987, p. 14.

[11] Ministerie Van Sociale Zaken en Werkgelegenheid, *De arbeidsmarkt* [Ministry of Social Affairs and Labor, *The Labor Market*] in September 1987, p. 4.

[12] Organization for Economic Cooperation and Development, *Economic Survey of The Netherlands* (Paris, OECD, February 1985), pp. 12–13.

[13] Organization for Economic Cooperation and Development, *Economic Survey of Italy* (Paris, OECD, July 1986), p. 37.

[14] See Organization for Economic Cooperation and Development, *Quarterly Labor Force Statistics*, appendix, each issue. In 1986, the OECD suspended the updating of current Standardized Unemployment Rates for Austria, Italy, and Switzerland. Standardized Unemployment Rates for previous years are still published for these three countries.

[15] For further information, see Constance Sorrentino, "The Uses of the European Community Labour Force Surveys for International Unemployment Comparisons," Statistical Office of the European Communities Seminar—The Community Labour Force Survey in the 1990's, Luxembourg, Oct. 12–14, 1987.

APPENDIX: Revisions in comparative statistics

Data for this article incorporate some revisions in the Bureau's methods for constructing comparative labor force and unemployment statistics for Germany, Italy, the Netherlands, and the United Kingdom. This section will briefly discuss these revisions, recent changes in the Australian and Swedish labor force surveys, the lower age limits used by the Bureau for classifying persons in the labor force, and the adjustment of Japanese unemployment rates by sex.

Germany and the Netherlands. For Germany and the Netherlands, the revisions reflect the replacement of labor force survey results tabulated by the German and Dutch statistical offices with those tabulated by the European Community Statistical Office, EUROSTAT, beginning with 1983. The EUROSTAT data for 1983 onward were judged by BLS to be closer to U.S. concepts than the national data for these countries.

The EUROSTAT data are based on raw national survey data which have been coded and processed by EUROSTAT to conform to common definitions and classifications. EUROSTAT requires unemployed persons to be currently available for work and to have actively sought work in the past 4 weeks—requirements not necessarily made in the national surveys. The EUROSTAT current availability concept differs somewhat

from the U.S. definition in that an unemployed person must be able to start work within 2 weeks of the reference week. Under the U.S. definition, they must be available during the reference period. In addition, certain groups are excepted from the test of job search in the past 4 weeks: the registered unemployed; persons awaiting the results of public sector recruitment exams; and persons seeking self-employment. However, the registered unemployed generally check with the employment offices on a monthly basis, and the number of persons in the other groups is probably not significant in either Germany or the Netherlands.

Although the switch to the EUROSTAT data provides better estimates for 1983 onward, it does introduce breaks in series at 1983. Unfortunately, the EUROSTAT data prior to 1983 are on a different conceptual basis and cannot be used for making comparative estimates. This discontinuity is small for Germany, but it is more significant for the Netherlands. For Germany, the impact of this change to a EUROSTAT benchmark was to lower the adjusted unemployment rate by about 0.3 percentage point. For the Netherlands, the BLS revision also reflects the replacement of man-year employment data with data from the Dutch Survey of Employed Persons. Data from the survey of employed persons more accurately reflect the development of part-time employment. The impact of these two changes has been to lower the adjusted Dutch jobless rate approximately 2 percentage points for 1983 onward. This is primarily because the Dutch labor force survey data did not exclude a significant number of registered unemployed persons who were not currently available.

Italy. The Italian revisions reflect a change in the Italian Central Bureau of Statistics' treatment of nonrespondents to the survey question on time of last job search, beginning in 1984. Prior to 1984, nonrespondents were separately enumerated. After 1984, this group was allocated among the various specified time intervals. The revised BLS adjusted series for 1959–83 performs a similar allocation for those years; the revised figures are approximately 0.5 percentage point higher than the previous estimates. Beginning in 1986, the Italian Central Bureau of Statistics revised its unemployment statistics to make them more consistent with EUROSTAT standards. BLS has requested additional information on this change and may revise its historical estimates when further data become available.

United Kingdom. The British revisions reflect the incorporation of data for Northern Ireland. For 1959–81, the previous Great Britain series was inflated to a United Kingdom basis by applying ratios of United Kingdom to Great Britain registered unemployment and employment figures. For 1982 onward, the estimates are based on the results of European Community labor force surveys for the United Kingdom. However, the benchmarks have been tabulated by the British Department of Employment rather than EUROSTAT.

The link between the old and new methods appears to be a good one which introduces only a slight break in series. The impact of these revisions resulted in a slight increase in the rates prior to 1981 because of higher unemployment in Northern Ireland. However, rates for 1982 forward are about 1 percentage point lower because adjustment factors are now based on more recent labor force survey results.

Australia and Sweden. Changes in the Australian and Swedish household surveys result from their adoption of the Thirteenth International Conference of Labour Statisticians' resolution regarding the treatment of unpaid family workers. The resolution recommended that unpaid family workers at work should be considered as employed, irrespective of the number of hours worked during the reference period. The United States did not adopt this resolution, and the U.S. treatment of unpaid family workers remains unchanged; in order to be classified as employed, unpaid family workers must work at least 15 hours during the reference week. Prior to April 1986 in Australia and January 1987 in Sweden, unpaid family workers also had to work 15 hours or more in the reference week to be classified as employed.

In Australia, the impact of this change was a marginally lower unemployment rate. Historical data reflecting the revised treatment of unpaid family workers have not been published.

The Swedish household survey results are also affected by changes in the survey questionnaire and in the upper age limit for classifying persons in the labor force that were introduced in January 1986. New questions regarding current availability were added and the period of active jobseeking was reduced from 60 days to 4 weeks. For 1986, the combined impact of all the changes was to raise employment by 0.8 percent and to lower unemployment by 16 percent. The unemployment rate was lowered by 0.5 percentage point. In January 1986, the upper age limit of the survey was lowered from 74 years to 64. Data on persons aged 65–74 are collected one quarter each year, however, and BLS adjusts the Swedish data to include persons older than the upper age limit. The Swedish data presented in this article for 1986 and earlier years are on the old survey basis. The BLS is in the process of revising its historical estimates for Sweden to take these changes into account.

Lower age limits. The foreign labor force and unemployment data analyzed in this article have been adjusted for comparability to U.S. concepts. The data are also generally adjusted to relate to the age at which compulsory schooling ends in each country. Thus, the BLS-adjusted data relate to the population 16 years and over in the United States, France, Sweden, and from 1973, the United Kingdom; 15

years and over in Canada, Australia, Japan, Germany (until 1983), the Netherlands (from 1975–82), and the United Kingdom (prior to 1973); and 14 years and over in Italy and the Netherlands (prior to 1975). With the incorporation of data from the European Community Labor Force Surveys for 1983 onward for Germany and the Netherlands, the lower age limit reverted to 14 years. However, there are few 14-year-olds in the labor force in either Germany or the Netherlands.

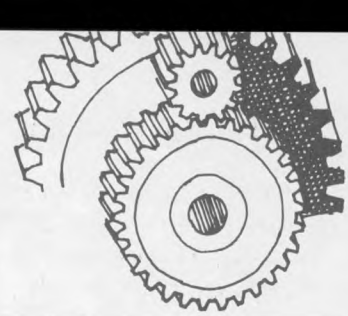
The working-age population coincides with the lower age limits of the adjusted labor force, employment, and unemployment statistics, except for Germany and the Netherlands for 1983 onward. For Germany and the Netherlands, working age relates to the population 15 years and over for 1983 onward. The institutionalized working age population is excluded in all countries studied except Japan and Germany.

Japanese unemployment rates by sex. There are a number of differences between U.S. and Japanese unemployment concepts, but the overall Japanese unemployment rate is virtually unchanged when U.S. concepts are applied. However, there is a marked difference in the adjusted unemployment rates for men and women. (See Constance Sorrentino, "Japan's low unemployment: an in-depth analysis," *Monthly Labor Review*, March 1984, pp. 18–27; and "Japanese unemployment: BLS updates its analysis," *Monthly Labor Review*, June 1987, pp. 47–53.)

Unemployment rates by sex for Japan are based on special labor force surveys taken in March of the 1977–80 period and February of the 1984–86 period. These special surveys probe deeper into the labor force status of the population than do the regular monthly surveys. The unemployment rates for the 1970–76 period are based on March 1977 survey data and rates for the 1981–83 period are based on March 1980 and February 1984 survey data.

A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, DC 20212.



Productivity Reports

Productivity in selected industries and government services in 1986

ARTHUR S. HERMAN

Labor productivity, as measured by output per employee hours, increased in 1986 in more than three-fourths of the industries for which current data are available. In comparison, less than two-thirds of the industries posted gains in 1985.

This article updates to the most current year all indexes included in the industry productivity measurement program of the Bureau of Labor Statistics. It extends the measures through 1986, and includes data on industry multifactor productivity measures through 1985 and data on Federal, State, and local government productivity measures through 1986.

Table 1 shows labor productivity trends in the industries measured by the Bureau and includes measures for additional industries: cotton and synthetic broad woven fabrics; industrial inorganic chemicals; industrial organic chemicals; nonelectric heating equipment; semiconductors and related devices; retail hardware stores; department stores; and automotive repair shops.[1]

Changes in industry labor productivity

Manufacturing. Among major manufacturing industries, both motor vehicles and steel registered small productivity gains in 1986. In motor vehicle manufacturing, productivity grew by 1.8 percent. Although output fell 2.2 percent in 1986, mainly because of a decline in the automobile segment of the industry, employee hours fell even more, dropping 4.0 percent. The productivity gain was the sixth consecutive one in this industry. In steel manufacturing, productivity was up 1.7 percent, as output dropped 5.9 percent, while employee hours fell 7.6 percent. Demand was off from automobile firms and from capital goods producers, such as the agricultural and industrial machinery industries, and other markets. The steel industry continued to eliminate less efficient plant and equipment. Steel manufacturing has recorded four consecutive annual increases in productivity.

A number of important manufacturing industries posted substantial gains in productivity in 1986, including petroleum refining (12.0 percent); sawmills (11.0 percent); and paper, paperboard, and pulp mills (7.1 percent). These industries recorded output growth in 1986. In petroleum refining, output was up 5.8 percent as demand was aided by a sharp drop in the price of petroleum products and hours fell off 5.6 percent as a number of less efficient refineries were closed. Sawmills posted an output gain of 11.5 percent, as a result of increased demand from the single-family housing market, while hours grew 0.5 percent. In the paper industry, output gained 5.9 percent, as demand was stimulated by favorable overall economic conditions, while hours were off 1.1 percent.

Only a small number of manufacturing industries registered productivity declines in 1986. These were metal forming machine tools (−8.7 percent); steel foundries and nonwool yarn mills (both −3.9 percent); oilfield machinery (−3.4 percent); gray iron foundries (−1.9 percent); and cigarettes (−0.2 percent).

Mining. Among the mining industries, coal mining had a productivity gain of 8.2 percent based on a small output increase of 0.3 percent, while hours fell 7.3 percent. Between 1985 and 1986, demand for coal remained fairly stable while the industry continued to close less efficient mines. Nonmetallic minerals posted a productivity advance of 1.0 percent; output dropped 0.6 percent, as declining demand from the agricultural chemicals market more than offset a gain from the construction materials market, and hours fell 1.6 percent. In copper mining (recoverable metal), productivity was up by a large 22.5 percent, as output grew 4.2 percent while hours dropped 14.9 percent. On the other hand, iron mining (usable ore) had a decline in productivity of 6.3 percent; output fell 20.6 percent because of a continued decline in demand from the steel industry, while hours dropped 15.2 percent.

Transportation and utilities. Productivity changes were mostly positive among transportation and utility industries. Railroads had a large productivity gain of 11.0 percent; output grew 1.9 percent while employee hours continued to decline (−8.2 percent). In air transportation, productivity grew 1.2 percent. Air traffic was up significantly in 1986, and output grew 8.8 percent, while employment also was up (7.6 percent). Petroleum pipelines had a gain in productivity of 2.8 percent, as output grew 1.6 percent while employee hours fell 1.1 percent. In telephone communications, productivity was up 6.0 percent based on an output gain of 2.2 percent and a drop in employee hours of 3.6 percent. Pro-

Arthur S. Herman is an economist in the Office of Productivity and Technology, Bureau of Labor Statistics.

Table 1. Indexes of output per employee hour in selected industries, 1981–86, and percent changes, 1985–86 and 1981–86
[1977=100]

SIC Code[1]	Industry	1981	1982	1983	1984	1985	1986[2]	Percent change, 1985–86	Average annual percent change, 1981–86
	Mining								
1011	Iron mining, crude ore	132.8	100.9	139.0	173.3	187.9	178.3	−5.1	10.7
1011	Iron mining, usable ore	130.6	98.2	138.6	171.7	187.9	176.1	−6.3	11.0
1021	Copper mining, crude ore	102.0	106.4	129.9	140.3	164.2	201.4	22.7	14.6
1021	Copper mining, recoverable metal	97.7	116.2	130.9	153.9	193.1	236.5	22.5	19.1
111,21	Coal mining	122.2	119.2	136.1	151.3	154.0	166.7	8.2	7.2
121	Bituminous coal and lignite mining	122.7	120.0	136.9	152.3	154.6	168.1	8.7	7.2
14	Nonmetallic minerals, except fuels	94.7	89.3	98.2	105.5	107.6	108.7	1.0	3.8
142	Crushed and broken stone	96.7	94.1	103.9	105.8	104.5	104.8	.3	2.1
	Manufacturing								
2011,13	Red meat products	107.9	112.3	115.9	117.0	119.5	122.1	2.2	2.4
2011	Meat packing plants	113.9	119.5	123.4	125.6	130.1	131.7	1.2	2.9
2013	Sausages and other prepared meats	95.0	96.5	100.0	99.5	98.8	102.2	3.4	1.2
2016,17	Poultry dressing and processing	116.4	125.6	131.7	130.3	133.2	(3)	(3)	[4]3.1
2026	Fluid milk	128.0	135.3	142.4	147.7	152.3	(3)	(3)	[4]4.4
203	Preserved fruits and vegetables	99.2	107.9	110.4	113.1	112.6	(3)	(3)	[4]3.1
2033	Canned fruits and vegetables	100.7	108.6	112.2	115.7	122.6	(3)	(3)	[4]4.7
204	Grain mill products	110.9	121.0	125.5	132.8	144.9	(3)	(3)	[4]6.5
2041,45	Flour (including flour mixes) and other grains	99.1	112.3	117.7	122.9	126.0	(3)	(3)	[4]5.9
2041	Flour and other grain mill products	96.7	104.1	110.4	114.9	122.9	134.1	9.1	6.4
2043	Cereal breakfast foods	109.3	115.0	118.8	129.3	133.8	(3)	(3)	[4]5.4
2044	Rice milling	117.9	104.5	103.3	93.2	103.2	(3)	(3)	[4]−3.7
2046	Wet corn milling	137.5	138.8	156.9	192.1	198.4	(3)	(3)	[4]11.2
2047,48	Prepared feeds for animals and fowls	110.7	124.9	127.5	132.5	143.8	(3)	(3)	[4]6.0
205	Bakery products	96.2	103.3	106.9	106.8	108.5	(3)	(3)	[4]2.8
2061,62,63	Sugar	98.8	90.4	98.6	99.7	105.5	109.1	3.4	2.8
2061,62	Raw and refined cane sugar	98.8	87.6	100.0	94.7	108.7	111.4	2.5	3.5
2063	Beet sugar	98.7	94.8	94.5	108.8	100.7	107.4	6.7	2.1
2082	Malt beverages	118.3	122.6	131.3	137.9	130.3	137.0	5.1	2.8
2086	Bottled and canned soft drinks	114.3	118.3	127.0	138.3	145.3	149.0	2.5	6.0
2111,21,31	Total tobacco products	100.5	100.7	105.1	110.3	113.4	114.7	1.1	3.1
2111,31	Cigarettes, chewing and smoking tobacco	99.6	99.5	104.1	107.2	111.7	111.5	−.2	2.7
2121	Cigars	107.3	111.4	112.3	141.4	129.3	150.0	16.0	7.0
2211,21	Cotton and synthetic broad woven fabrics	107.4	112.5	121.6	119.9	123.9	130.3	5.2	3.6
2251,52	Hosiery	122.0	114.2	118.0	119.7	118.3	118.6	.3	−.1
2281	Nonwool yarn mills	103.1	118.2	128.5	129.6	134.5	129.2	−3.9	4.5
2421	Sawmills and planing mills, general	107.9	115.1	126.8	132.3	139.2	154.5	11.0	7.1
2431	Millwork	96.4	86.1	87.9	88.7	85.7	(3)	(3)	[4]−2.0
2434	Wood kitchen cabinets	94.8	96.1	94.3	94.2	89.1	(3)	(3)	[4]−1.4
2435,36	Veneer and plywood	106.9	114.4	121.1	120.0	121.3	(3)	(3)	[4]3.1
2435	Hardwood veneer and plywood	100.3	101.4	110.1	103.9	108.9	(3)	(3)	[4]1.9
2436	Softwood veneer and plywood	111.8	122.1	127.3	129.6	128.2	(3)	(3)	[4]3.4
251	Household furniture	103.0	104.7	110.2	112.3	112.5	116.9	3.9	2.5
2511,17	Wood household furniture	97.3	98.2	103.9	105.6	104.5	(3)	(3)	[4]2.2
2512	Upholstered household furniture	110.5	115.9	121.7	122.8	124.7	(3)	(3)	[4]3.0
2514	Metal household furniture	98.7	107.5	109.2	121.3	123.9	(3)	(3)	[4]5.9
2515	Mattresses and bedsprings	114.0	104.3	108.8	109.7	109.0	113.4	4.0	.3
252	Office furniture	108.8	107.4	112.0	117.7	116.7	117.2	.4	1.9
2521	Wood office furniture	99.5	90.3	93.9	96.0	96.2	(3)	(3)	[4]−.1
2522	Metal office furniture	114.0	116.6	122.1	130.4	128.2	(3)	(3)	[4]3.5
2611,21,31,61	Paper, paperboard, and pulp mills	104.4	111.3	119.5	121.0	120.3	128.8	7.1	3.8
2643	Paper and plastic bags	92.3	95.3	102.9	105.6	107.2	(3)	(3)	[4]4.1
2651	Folding paperboard boxes	104.5	104.2	104.5	102.4	99.6	103.3	3.7	−.6
2653	Corrugated and solid fiber boxes	109.8	111.9	114.0	118.9	122.5	127.3	3.9	3.1
281	Industrial inorganic chemicals	91.4	86.3	94.2	106.0	102.6	(3)	(3)	[4]4.5
2812	Alkalies and chlorine	95.3	100.8	127.1	146.3	147.4	(3)	(3)	[4]13.3
2816	Inorganic pigments	105.1	96.7	104.0	125.7	132.7	(3)	(3)	[4]7.6
2819 pt	Industrial inorganic chemicals, n.e.c.	89.3	80.8	86.9	97.5	95.3	(3)	(3)	[4]3.2
2823,24	Synthetic fibers	120.9	103.6	126.2	125.3	135.8	148.2	9.1	5.3
2834	Pharmaceutical preparations	104.2	107.0	115.2	114.3	111.9	114.8	2.6	1.8
2841	Soaps and detergents	107.3	100.9	97.7	101.8	103.3	(3)	(3)	[4]−.7
2844	Cosmetics and other toiletries	76.1	84.0	86.2	85.2	86.7	(3)	(3)	[4]2.8
2851	Paints and allied products	99.8	106.5	111.5	119.0	117.3	122.1	4.1	4.0
2869	Industrial organic chemicals, n.e.c.	103.9	87.2	105.3	114.0	112.4	(3)	(3)	[4]4.3
2911	Petroleum refining	83.7	79.4	81.8	92.5	102.6	114.9	12.0	7.3
3011	Tires and inner tubes	118.1	128.2	136.1	146.8	146.7	148.1	1.0	4.7
3079	Miscellaneous plastics products	98.5	110.1	107.3	110.5	113.0	(3)	(3)	[4]2.8
314	Footwear	95.6	106.4	103.9	105.7	107.3	107.4	.1	1.8
3221	Glass containers	110.1	105.8	108.5	128.0	127.0	135.8	6.9	5.2
3241	Hydraulic cement	91.1	94.0	108.4	125.3	128.3	132.6	3.4	8.8
325	Structural clay products	100.7	102.6	105.0	111.2	111.8	115.9	3.7	3.0
3251,53,59	Clay construction products	97.3	103.3	101.0	110.4	111.7	116.2	4.0	3.5
3251	Brick and structural clay tile	84.3	88.6	85.5	93.3	99.5	103.6	4.1	4.3
3253	Ceramic wall and floor tile	125.9	128.1	126.2	144.0	131.1	(3)	(3)	[4]2.0

See footnotes at end of table.

Table 1. Continued—Indexes of output per employee hour in selected industries, 1981–86, and percent changes, 1985–86 and 1981–86

[1977=100]

SIC Code[1]	Industry	1981	1982	1983	1984	1985	1986[2]	Percent change, 1985–86	Average annual percent change, 1981–86
3255	Clay refractories	111.1	100.0	121.6	115.1	114.1	117.3	2.8	1.8
3271,72	Concrete products	88.5	91.0	97.6	99.2	100.5	(3)	(3)	[4]3.5
3273	Ready-mixed concrete	95.4	90.6	93.7	96.3	97.4	(3)	(3)	[4]1.0
331	Steel	112.0	90.9	116.8	131.3	139.5	141.9	1.7	7.7
3321	Gray iron foundries	92.7	93.7	98.3	106.8	104.2	102.2	−1.9	2.6
3324,25	Steel foundries	91.6	89.0	89.9	98.8	95.6	91.9	−3.9	.9
3331,32,33	Primary copper, lead, and zinc	118.6	128.0	141.2	148.4	181.3	200.9	10.9	11.2
3331	Primary copper	124.4	128.5	138.3	151.9	189.8	214.8	13.2	12.1
3334	Primary aluminum	103.8	103.0	111.5	125.4	125.4	128.2	2.2	5.2
3351	Copper rolling and drawing	97.3	105.4	120.2	127.4	121.3	129.9	7.1	5.7
3353,54,55	Aluminum rolling and drawing	96.8	99.2	110.4	116.2	115.9	125.8	8.5	5.4
3411	Metal cans	107.8	118.5	120.4	122.9	125.8	129.5	2.9	3.2
3423	Hand and edge tools	95.2	92.8	89.3	90.1	90.6	(3)	(3)	[4]−1.3
3433	Heating equipment, except electric	94.6	102.3	93.2	102.0	97.7	(3)	(3)	[4]0.6
3441	Fabricated structural metal	98.5	99.5	103.0	107.9	117.7	(3)	(3)	[4]4.5
3442	Metal doors, sash, and trim	90.4	96.0	99.7	102.8	106.3	(3)	(3)	[4]4.0
3465,66,69	Metal stampings	101.4	98.1	104.7	110.4	104.7	(3)	(3)	[4]1.8
3465	Automotive stampings	105.0	106.7	122.3	127.9	120.1	(3)	(3)	[4]4.6
3469	Metal stampings, n.e.c.	98.0	89.3	89.3	96.1	90.1	(3)	(3)	[4]−0.9
3494	Valves and pipe fittings	105.4	101.3	103.6	105.1	104.5	(3)	(3)	[4]−0.2
3498	Fabricated pipe and fittings	93.5	89.5	87.1	97.9	90.4	(3)	(3)	[4]0.2
3519	Internal combustion engines, n.e.c.	93.2	82.0	86.8	99.8	102.7	(3)	(3)	[4]4.0
352	Farm and garden machinery	95.1	94.9	95.3	105.2	101.7	(3)	(3)	[4]2.4
3523	Farm machinery and equipment	94.1	92.6	92.0	104.6	98.8	(3)	(3)	[4]2.2
3524	Lawn and garden equipment	101.0	106.9	111.9	111.4	115.7	(3)	(3)	[4]3.2
3531	Construction machinery and equipment	96.1	88.9	88.2	102.6	104.1	105.3	1.2	3.1
3532	Mining machinery and equipment	97.8	91.0	91.3	98.5	101.4	(3)	(3)	[4]1.5
3533	Oilfield machinery and equipment	104.7	98.4	91.8	87.5	80.1	77.4	−3.4	−6.0
3541,42	Machine tools	96.5	88.5	83.5	94.0	92.0	95.2	3.5	0.5
3541	Metal cutting machine tools	98.9	89.2	81.1	93.3	96.4	104.7	8.6	1.9
3542	Metal forming machine tools	89.4	85.0	87.4	93.7	79.5	72.6	−8.7	−3.3
3545	Machine tool accessories	102.0	89.1	83.0	95.4	92.7	(3)	(3)	[4]−1.2
3561,63	Pumps and compressors	102.4	95.9	100.2	106.1	108.3	(3)	(3)	[4]2.2
3561	Pumps and pumping equipment	101.7	93.1	97.7	104.4	104.8	(3)	(3)	[4]1.8
3562	Ball and roller bearings	94.3	83.3	86.3	94.4	93.2	93.5	0.3	1.1
3563	Air and gas compressors	106.8	102.0	105.2	109.7	111.9	(3)	(3)	[4]1.7
3585	Refrigeration and heating equipment	99.4	100.1	100.9	105.4	103.7	(3)	(3)	[4]1.4
3612	Transformers	106.9	99.6	99.1	97.6	99.3	101.9	2.6	−0.8
3613	Switchgear and switchboard apparatus	99.5	101.3	106.1	107.4	110.9	121.2	9.3	3.7
3621	Motors and generators	100.4	102.4	104.3	107.9	110.5	(3)	(3)	[4]2.5
3631,32,33,39	Major household appliances	107.6	108.6	117.6	123.6	127.2	135.7	6.7	4.9
3631	Household cooking equipment	105.7	112.6	120.8	131.9	135.6	144.8	6.8	6.5
3632	Household refrigerators and freezers	117.4	116.1	127.1	127.5	136.8	146.1	6.8	4.6
3633	Household laundry equipment	103.9	105.4	112.2	117.5	118.2	123.3	4.3	3.6
3639	Household appliances, n.e.c.	100.4	94.7	103.7	109.8	110.0	119.3	8.5	4.0
3641	Electric lamps	106.9	108.4	124.8	131.9	126.9	128.7	1.4	4.2
3645,46,47,48	Lighting fixtures	88.7	91.0	96.3	102.2	107.0	(3)	(3)	[4]5.0
3651	Radio and television receiving sets	133.6	163.9	196.1	236.9	249.8	256.9	2.8	14.4
3674	Semiconductors and related devices	171.6	197.9	211.5	229.2	206.1	218.4	6.0	4.1
371	Motor vehicles and equipment	93.1	96.9	109.6	115.7	121.1	123.3	1.8	6.3
3825	Instruments to measure electricity	111.9	119.2	121.8	133.7	130.4	(3)	(3)	[4]4.3
	Other								
401	Railroad transportation, revenue traffic	111.5	115.8	141.9	152.6	162.1	179.9	11.0	10.4
401	Railroad transportation, car miles	107.6	110.1	128.9	137.7	138.9	148.2	6.7	7.0
4111,31,414 pt	Class I bus carriers	90.7	98.8	95.4	90.9	88.2	(3)	(3)	[4]−1.4
4213	Intercity trucking	98.7	93.3	101.0	102.5	97.2	(3)	(3)	[4]0.6
4213	Intercity trucking, general freight	92.5	86.8	92.5	94.2	90.5	(3)	(3)	[4]0.4
4511,4521 pt	Air transportation[5]	104.9	114.9	126.8	131.7	136.5	138.1	1.2	5.7
4612,13	Petroleum pipelines	86.0	89.2	94.3	104.5	104.9	107.8	2.8	5.0
4811	Telephone communications	124.4	129.1	145.1	143.0	149.9	158.9	6.0	4.8
491,492,493	Gas and electric utilities	94.4	89.3	88.1	91.4	90.5	88.9	−1.8	−0.6
491,493 pt	Electric utilities	93.0	89.5	90.9	94.4	93.5	94.6	1.2	0.7
492,493 pt	Gas utilities	98.1	89.0	81.1	83.6	82.1	75.3	−8.3	−4.3
5251	Hardware stores[6]	107.3	108.9	107.0	112.8	111.4	118.1	6.0	1.7
5311	Department stores	106.0	107.4	114.9	122.1	125.0	130.3	4.2	4.5
54	Retail food stores[6]	95.2	93.5	93.9	93.6	94.2	93.0	−1.3	−0.3
5511	Franchised new car dealers	98.1	100.4	109.4	110.4	109.7	111.3	1.5	2.6
5541	Gasoline service stations[6]	105.8	110.7	118.1	121.0	122.6	126.6	3.3	3.6
56	Apparel and accessory stores[6]	127.1	130.9	137.8	146.6	152.2	162.8	7.0	5.1
5611	Men's and boys' clothing stores[6]	115.6	115.7	120.1	127.2	133.2	144.3	8.3	4.6
5621	Women's ready-to-wear stores[6]	139.0	158.2	169.7	178.4	187.8	206.6	10.0	7.5
5651	Family clothing stores[6]	131.4	139.6	149.8	148.1	142.5	141.3	−0.8	1.2
5661	Shoe stores[6]	113.0	108.9	110.0	116.5	128.1	141.1	10.1	4.8
57	Furniture, home furnishings, and equipment stores[6]	112.6	109.2	118.4	128.1	131.0	141.2	7.8	5.1
571	Furniture and home furnishings stores[6]	101.2	97.6	104.1	112.9	108.4	114.3	5.4	2.9
572,3	Appliance, radio, television, and music stores[6]	132.4	128.7	143.4	154.7	172.8	191.8	11.0	8.4

See footnotes at end of table.

Table 1. Continued—Indexes of output per employee hour in selected industries, 1981–86, and percent changes, 1985–86 and 1981–86
[1977=100]

SIC Code[1]	Industry	1981	1982	1983	1984	1985	1986[2]	Percent change, 1985–86	Average annual percent change, 1981–86
58	Eating and drinking places[6]	97.0	96.6	97.1	94.9	93.5	96.3	3.0	−0.4
5912	Drug and proprietary stores[6]	107.6	107.9	110.1	105.0	100.3	97.0	−3.3	−2.2
592	Liquor stores[6]	103.7	107.8	101.7	99.1	105.9	109.1	3.0	0.5
602	Commercial banking	90.5	93.2	101.7	104.6	109.2	(3)	(3)	45.0
7011	Hotels, motels, and tourist courts[6]	91.6	88.8	95.4	102.1	97.5	92.8	−4.8	−1.2
721	Laundry and cleaning services[6]	88.1	90.2	90.1	92.1	87.0	84.9	−2.4	−0.8
723,724	Beauty and barber shops[6]	109.2	108.3	114.1	103.9	98.5	98.7	0.2	−2.5
723	Beauty shops[6]	114.7	113.1	120.0	112.3	104.0	103.2	−0.8	−2.4
753	Automotive repair shops[6]	93.6	87.7	86.2	88.5	96.2	94.1	−2.2	−0.9

[1] As defined in the *Standard Industrial Classification Manual, 1972*, published by the Office of Management and Budget.
[2] Preliminary.
[3] Not available.
[4] Percent change, 1981–85.
[5] Output per employee.
[6] Output per hour of all persons.

NOTE: Although the output per employee hour measures relate output to the hours of all employees engaged in each industry, they do not measure the specific contribution of labor, capital or any other single factor of production. Rather, they reflect the joint effects of many influences, including new technology, capital investment, the level of output, capacity utilization, energy use, and managerial skills, as well as the skills and efforts of the work force. Some of these measures use a labor input series that is based on hours paid, and some use a labor input series that is based on plant hours.
n.e.c. = not elsewhere classified.

ductivity in electric utilities grew 1.2 percent, with output up 2.2 percent and hours up 1.1 percent. On the other hand, gas utilities posted a productivity decline of 8.3 percent; output fell 11.1 percent partly because of a warm winter and the shift of some customers to cheaper oil heat. Employee hours were off 3.1 percent.

Trade and services. Productivity changes were mixed among the trade and service industries. Furniture, home furnishings, and equipment stores posted a 7.8-percent productivity gain, as output grew 9.3 percent while hours were up 3.8 percent. The demand for furniture and appliances was up because of the expansion in new and existing home sales, while home electronics also had a good year, fueling the large output gain. The appliance, radio, and TV component of this industry recorded an 11.0-percent productivity gain. Apparel and accessory stores had a 7.0-percent gain in productivity; output was up 9.1 percent, as sales were good in all types of apparel stores; and all person hours grew 2.0 percent. Changes in productivity among the components of this industry ranged from 10.1 percent in shoe stores to −0.8 percent in family clothing stores. The gasoline service station industry posted a 3.3-percent gain as output grew 5.0 percent, helped by lower gasoline prices, while hours were up 1.6 percent. Both eating and drinking places and liquor stores had 3.0-percent productivity increases, while new car dealers had a gain of 1.5 percent, and beauty and barber shops grew 0.2 percent.

Productivity declines were posted by a number of trade and service industries. There was a decline of 1.3 percent in retail food stores. Output was up 1.8 percent while hours grew 3.1 percent, as the industry continued to provide more service-oriented operations such as delicatessens, salad bars, in-store bakeries, pharmacies, and photo departments. Other industries with declines in productivity were laundries and cleaning services (−2.4 percent), drug stores (−3.3 percent), and hotels and motels (−4.8 percent).

Trends, 1981–86

A large majority of the measured industries recorded average annual gains in productivity over the 1981–86 period. Copper mining (recoverable metal) posted the highest rate of growth in the last 5 years, averaging 19.1 percent a year. Intense international competition in recent years has resulted in improved mining methods and the shutdown of older, less efficient mines. The radio and television receiving sets industry experienced the second highest rate of gain during the 1981–86 period—14.4 percent per year. Productivity growth in this highly competitive industry was aided by the widespread use of automated production technology and the closing of less efficient plants. Other industries with high rates of gain during 1981–86 include: alkalies and chlorine (13.3 percent, 1981–85); primary copper, lead, and zinc (11.2 percent); wet corn milling (11.2 percent, 1981–85); iron mining (usable ore) (11.0 percent); and railroad transportation (revenue traffic) (10.4 percent).

However, several industries showed marked declines in productivity in the 1981–86 period. Among these, the oilfield machinery industry recorded the greatest falloff, declining at a rate of 6.0 percent. The industry faced a sharp drop in demand for its products stemming from a downward movement in the price of crude oil. Falling output coupled with the industry's made-to-order, labor intensive operations, aggravated the productivity decline. Additionally, the gas utilities industry was also among those industries that had a marked falloff in productivity (−4.3 percent annually). During the 1981–86 period, the output of this industry fell at a rate of 5.0 percent because of a decline in average use per customer. There was only a minimal decline in employee hours due to an increase in the number of customers. Thus, productivity declined substantially. Other industries with substantial declines were: rice milling (−3.7 percent, 1981–85); metal forming machine tools (−3.3 per-

cent); beauty and barber shops (−2.5 percent); and drug stores (−2.2 percent).

Industry multifactor productivity

Measures of multifactor productivity are presented for the steel and motor vehicles industries. These industry measures are the first to be published from the Bureau's industry multifactor productivity project. This is an ongoing program and measures for additional industries will be published as they are completed.[2]

In multifactor productivity measures, output is related to combined inputs of labor, capital, and intermediate purchases. Multifactor productivity is equal to output per hour adjusted to remove the effects of changes in capital per hour and intermediate purchases per hour (materials, fuels, electricity, and services). These effects are measured as the change in the nonlabor to labor input ratio, weighted by the nonlabor input's share in total output. The capital effect, for example, is the change in the capital-labor ratio weighted by capital's share in output. Multifactor productivity measures still show the effect of many influences such as economies of scale, capacity utilization, skill and effort of the work force, and technological change.

The multifactor measures for the steel and motor vehicles industries are available through 1985. Because these measures were greatly affected by cyclical changes in the economy, the periods from the last peak forward are analyzed here, rather than the last 5 years as done for the other measures. For the steel industry, the period 1979–85 is discussed while for the motor vehicles industry, 1978–85 is covered. Table 2 shows multifactor productivity and related data for these periods for the two industries.

Steel. Multifactor productivity in the steel industry grew at an average annual rate of 3.4 percent per year between 1979 and 1985, as output fell at a rate of 6.1 percent, and combined inputs fell more steeply at a 9.2-percent rate. This performance can be compared with growth of 4.8 percent per year in output per hour in steel manufacturing over the same period. The difference between the growth rate of labor productivity (output per hour) and that of multifactor productivity was attributable to a 0.3-percent average annual growth in the capital effect (the change in the capital-labor ratio weighted by the capital share of about 15 percent) and a 1.1-percent intermediate purchases effect (the change in the ratio of intermediate purchases to labor weighted by the intermediate purchases share of about 50 percent).

Some large, integrated mills with obsolescent plant and equipment closed, as the restructuring of the industry continued during the 1979–85 period, while diffusion of technological changes such as the electric arc furnace and the continuous casting steel making method increased. Labor hours fell faster (−10.4 percent) than capital (−3.2 percent) or intermediate purchases (−8.8 percent) in this period, and both the capital-labor and intermediate purchases-labor ratios increased.

Motor vehicles. Multifactor productivity in the motor vehicles and equipment industry grew at an average annual rate of 0.8 percent per year between 1978 and 1985, as output gains averaged 1.7 percent per year and combined inputs rose at a 0.9-percent rate. Labor productivity (output per hour) grew by 3.5 percent per year. The difference between the growth of labor productivity and that of multifactor productivity was almost entirely attributable to the intermediate purchases effect. Changes in the capital-labor ratio were so slight as to have virtually no effect on labor productivity over the period. Both labor and capital declined during this period, while intermediate purchases increased. Between 1978 and 1985, the intermediate purchases effect made up the entire difference between labor productivity and multifactor productivity and, in fact, was a larger source of the growth in labor productivity than was multifactor productivity.

Table 2. Multifactor and related productivity indexes[1] for selected industries, 1978 or 1979–85

[1977=100]

SIC Code	Industry and measure	1978	1979	1980	1981	1982	1983	1984	1985[2]	Average annual percent change
										1979–85
331	Steel:									
	Multifactor productivity	—	104.4	102.4	101.6	96.4	115.0	119.4	123.6	3.4
	Output per hour	—	106.6	105.8	112.1	98.1	119.5	131.3	140.5	4.8
	Output per unit of capital	—	114.3	99.5	108.2	72.5	82.6	95.4	97.3	−2.9
	Output per unit of intermediate purchases	—	101.5	100.7	95.5	96.8	114.0	113.6	116.0	3.0
										1978–85
371	Motor vehicles and equipment:									
	Multifactor productivity	100.1	98.8	89.6	90.3	90.9	96.7	101.1	105.1	.8
	Output per hour	99.6	97.5	89.8	92.0	96.2	109.4	115.3	121.2	3.5
	Output per unit of capital	98.0	86.8	61.8	62.9	57.2	80.7	104.1	110.9	3.0
	Output per unit of intermediate purchases	100.7	102.0	95.0	95.1	95.6	94.1	93.9	96.7	−.9

[1] The output measures underlying the productivity indexes relate to the total net production of the industry. They do not relate to the specific output of any single factor of production.
[2] Preliminary.
NOTE: Dashes indicate data are not available.

Government productivity

Measures of output per employee year for the Federal Government and selected State and local government services are included here for the first time. Data are presented from fiscal years 1981–86 for most series and are shown in table 3.[3]

Federal. Output per employee year increased 1.7 percent in fiscal 1986 in the measured sample of Federal Government organizations. This gain reflected a 2.3-percent increase in output and a 0.6-percent increase in employee years. The 1986 productivity rate surpassed the 1985 rate of 0.7 percent.

The measure covers a sample of Federal agencies drawn from 60 agencies and representing 380 organizational units in fiscal 1986. The organizations included 2.0 million executive branch civilian employees representing 68 percent of the total Federal civilian labor force. Agency employee coverage ranged from 100 percent to 1.2 percent.

The Federal organizational units are divided into 28 functional groups based on similarity of tasks performed (for example, auditing, medical, personnel, and transportation) to better identify and understand the forces which affect Federal productivity. The change in output per employee year for the 28 functions in 1986 ranged from an increase of 8.4 percent for regulation compliance and enforcement to a decline of 7.5 percent for traffic management. Productivity increased in 19 functions and decreased in 9.

The regulation compliance and enforcement function includes 64 organizations that enforced Federal rules, regulations, and laws in 1986. Organizational examples include coal mine inspection, hazardous substance response, customs, and consumer product safety. The 8.4-percent increase in productivity in this function in 1986 was driven by a 9.1-percent increase in output; labor increased 0.7 percent. The 1985 increase in productivity was 2.8 percent.

The traffic management function, which includes those organizations responsible for arranging for the movement of people and goods, showed a 7.5-percent drop in productivity in 1986. Both output and employee years declined in 1986 but the 8.1-percent decrease in output exceeded the 0.7-percent drop in employment. Each of the three organizational units comprising this function showed decreasing output in 1986.

The postal service function, the largest of the 28 functions in terms of employees, includes only a single organization, the U.S. Postal Service. In fiscal 1986, its productivity grew at 1.3 percent, up from 0.4 percent in 1985. During 1986,

Table 3. Productivity indexes[1] for government, 1981–86

SIC Code	Functional group	1981	1982	1983	1984	1985	1986	Percent change, 1985–86	Average annual percent change, 1981–86
	Federal								
	Total, Federal sample	107.0	108.6	110.3	110.6	111.3	113.2	1.7	1.0
	Audit of operations	97.0	93.3	95.3	97.9	100.6	93.7	−6.9	.2
	Building and grounds	122.1	127.0	127.9	130.4	128.8	125.3	−2.7	.5
	Communications	178.4	183.2	196.1	213.8	226.1	236.3	4.5	6.2
	Education and training	115.8	111.8	109.2	108.1	108.6	109.2	.6	−1.1
	Electric power production and distribution	85.6	62.8	77.9	67.2	58.5	54.5	−6.9	−7.2
	Equipment maintenance	110.3	110.5	110.5	115.5	117.1	119.3	1.8	1.8
	Finance and accounting	127.9	150.8	166.6	163.9	163.2	170.0	4.2	4.8
	General support services	129.3	162.0	158.2	148.6	136.1	143.0	5.1	−.2
	Information services	104.4	106.7	114.0	118.8	124.6	125.9	.1	4.2
	Legal and judicial	104.4	108.9	112.0	110.5	113.7	113.8	.1	1.6
	Library services	111.5	107.2	110.1	118.6	120.9	130.8	8.3	3.6
	Loans and grants	110.3	104.7	117.3	112.1	122.4	122.7	.3	2.8
	Medical services	100.8	101.9	103.9	103.4	103.6	105.4	1.7	.8
	Military base services	104.9	109.3	107.9	99.4	100.4	108.0	7.5	−.6
	Natural resources and environmental management	102.7	111.9	112.7	118.2	120.0	121.1	.9	3.1
	Personnel investigations	109.7	104.5	99.4	102.2	105.6	99.4	−5.8	−1.2
	Personnel management	97.3	106.7	94.3	101.9	100.1	99.0	−1.1	−.1
4311	Postal service	106.4	107.0	107.9	109.8	110.3	111.7	1.3	1.0
	Printing and duplication	102.6	105.8	113.1	120.3	122.1	125.0	2.4	4.3
	Procurement	127.7	125.3	124.7	127.2	122.5	119.4	−2.6	−1.1
	Records management	113.8	120.0	120.5	123.5	121.7	122.9	.1	1.3
	Regulation—compliance and enforcement	112.5	118.6	126.6	126.9	130.5	141.4	8.4	4.2
	Regulation—rulemaking and licensing	121.7	131.4	139.3	146.1	153.3	150.5	−1.8	4.6
	Social services and benefits	102.1	102.4	109.8	110.1	118.7	118.6	−.1	3.5
	Specialized manufacturing	141.8	133.4	138.0	143.8	146.9	149.4	1.7	1.7
	Supply and inventory control	98.8	106.1	104.3	100.2	96.7	98.2	1.6	−1.0
	Traffic management	124.8	117.0	115.8	112.7	120.8	111.8	−7.5	−1.4
	Transportation	112.0	114.3	114.6	113.2	114.4	116.3	1.7	.5
	State and local								
	Alcoholic beverages	105.2	107.8	109.7	110.3	108.5	(2)	(2)	3.9
4911	Electric power	99.1	96.7	94.8	93.3	93.8	(2)	(2)	3−1.4
9441	Unemployment insurance	101.6	117.9	119.1	102.0	105.0	110.0	4.8	−.3

[1] Output per employee year.
[2] Not available.
[3] Percent change—1981–85.

output increased 4.4 percent while labor increased 3.0 percent.

Trends, 1981–86. Over the 1981–86 period, output per employee year in the Federal sample rose at an average annual rate of 1.0 percent. The year-to-year changes in productivity ranged from a low of 0.2 percent in 1984 to 1.7 percent in 1986. The overall increase in Federal productivity reflects an average rise of 2.3 percent in output and a 1.3-percent increase in labor input. Output increased annually at rates ranging from 1.2 percent in 1982 to 2.7 percent in 1985. Annual rates of change in employee years ranged from a drop of 0.2 percent in 1982 to an increase of 2.1 percent in 1984.

From 1981 to 1986, productivity trends for the 28 functions ranged from 6.2-percent annual growth for communications to a 7.2-percent annual decline for electric power production and distribution.

Communications had the highest average annual increase in productivity (6.2 percent) of any of the 28 functions. In 1983 and 1984, productivity increased 7.0 percent and 9.0 percent, respectively. The six organizations accounting for this function in 1986 are in the Department of Defense, the Federal Emergency Management Agency, and the Department of State.

The function with the second largest average annual increase in productivity over the last 5 years is finance and accounting (4.8 percent), which includes internal government services, such as treasury bill and bond sales to the public. In 1986, 18 organizations were included in this function. Finance and accounting productivity had been driven by the automation of many of the routine processing operations. In one organization that serves the public, productivity doubled in 1 year as output mushroomed, operations were mechanized, and employment was held roughly constant.

From 1981–86, the electric power production and distribution function registered the largest decrease in productivity of the 28 functions. During this period, productivity has decreased in every year but one, which is a reflection of sharply decreasing output. Employment has been cut back over the past 5 years, but the decrease in output has exceeded the cut in input by a wide margin.

State and local services

Electric power. State and local government electric power output per employee year increased 0.5 percent in 1985, the last year for which data are available, as output and employment increased 2.9 percent and 2.5 percent, respectively. In 1984, output and employment also increased, but productivity dropped as employment grew more rapidly than output. However, from 1981 to 1985, productivity declined at an average annual rate of 1.4 percent as employment increased at a more rapid rate than output (3.0 percent versus 1.5 percent).

Unemployment insurance. State unemployment insurance productivity increased 4.8 percent in fiscal 1986 as output dropped 3.1 percent and inputs were cut 7.4 percent. In 1985, productivity increased 2.9 percent and output and employment dropped 1.2 percent and 4.1 percent, respectively. The decrease in output over the past 3 years is a reflection of decreasing unemployment in the Nation and the resulting drop in unemployment insurance claims and payments. Over the 1981–86 period, productivity fell at a rate of 0.3 percent, while output declined at an average annual rate of 5.3 percent, and labor decreased at a 5.0-percent rate.

State sales of alcoholic beverages. Output per employee year in State sales of alcoholic beverages dropped 1.6 percent in 1985, the latest year for which data are available, as output and input dropped 2.6 percent and 1.1 percent, respectively. In 1984, productivity increased as output and employment dropped. The drop in output and input in 1984 and 1985 is a continuation of trends that started in 1978, trends which reflect decreasing demand for alcoholic beverages, and a shift in several States from government to private sector operations. Over the 1981–85 period, productivity increased at a 0.9-percent average rate as employment fell at a higher rate than output (3.2 percent versus 2.4 percent.)

A full report, *Productivity Measures for Selected Industries and Government Services*, BLS Bulletin 2296, is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price $9.50. □

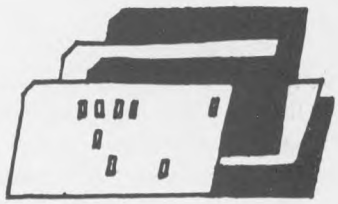
———*FOOTNOTES*———

[1] For a detailed report on productivity in these industries, see the following *Monthly Labor Review* articles: Mark W. Dumas and J. Edwin Henneberger, "Productivity trends in the cotton and synthetic broad woven fabrics industry"; Horst Brand and Ziaul Ahmed, "Productivty in industrial inorganic chemicals"; Clyde Huffstutler and Barbara Bingham, "Productivity in industrial organic chemicals"; John W. Ferris and Virginia L. Klarquist, "Productivity in nonelectric heating equipment"; Mark Scott Sieling, "Strong gains in semiconductor productivity linked to multiple innovations"; Patricia S. Wilder and Virginia L. Klarquist, "Productivity in the retail hardware store industry"; Brian L. Friedman, "Productivity trends in the department store industry"; and John G. Olsen and Richard B. Carnes, "Productivity in the automotive repair shop industry."

[2] For additional information about multifactor productivity in these two industries and a description of the methodology used to develop the industry productivity measures see Mark K. Sherwood, "Performance of multifactor productivity in the steel and motor vehicles industries," *Monthly Labor Review*, August 1987, pp. 22–30.

[3] For additional information about productivity in government, see Donald M. Fisk, "Productivity trends in the Federal Government," *Monthly Labor Review*, October 1985, pp. 3–9; Jerome A. Mark, "Public sector productivity measurement: The BLS experience," in *The Measurement and Implications of Productivity Growth: Proceedings of a Workshop, Nov. 22–23, 1984* (Canberra, Australia Department of Employment and Industrial Relations, Bureau of Labor Market Research, 1986), Monograph Series No. 14; and Donald M. Fisk, *Measuring Productivity in State and Local Government*, Bulletin 2166 (Bureau of Labor Statistics, 1983).

Research Summaries



Evaluating workplace injury and illness records; testing a procedure

WILLIAM M. EISENBERG AND HELEN MCDONALD

The Occupational Safety and Health Act of 1970 requires many private sector employers to keep records of work-related injuries and illnesses. The Bureau of Labor Statistics establishes recordkeeping guidelines (definitions) and collects data through a survey of these employers to produce national measures of the occurrence of occupational injuries and illnesses.

The results of the BLS survey are used by the Occupational Safety and Health Administration (OSHA) to identify and target industries for inspection. OSHA and other safety and health specialists, researchers, and government organizations also use the survey data in other efforts to improve worker safety and health. Finally, national and State data from the BLS survey also supply policymakers, as well as the general public, with information on workplace developments in the safety and health field.

Both BLS and OSHA are keenly aware of the need for—and the difficulties in securing—accurate information on injuries and illnesses in the workplace. First, the identification of occupational illness has been a longstanding problem. Occupational illness often develops over a long period of time, and the causal relationship to the workplace is frequently very difficult to establish. Second, problems can occur in recording injuries in the workplace. The fact that employers and workers do not fully understand the recordkeeping definitions or fail to record injuries for some other reason may result in underrecording of job-related injuries and fatalities.

For some time, BLS and OSHA have been investigating methods for evaluating the quality of the occupational safety and health data and for improving these data where necessary. This article reports on one of these initiatives: a pilot project to test the feasibility of a case-by-case comparison of the employer's OSHA recordkeeping log with medical records, workers' compensation reports, and other material at the business establishment.

William M. Eisenberg is Assistant Commissioner, Office of Safety, Health, and Working Conditions, Bureau of Labor Statistics; Helen McDonald is an economist in the same office.

Description of the project

The pilot project involved a visit by OSHA inspectors to evaluate recordkeeping in a random sample of approximately 200 manufacturing establishments with more than 10 employees—half of the establishments were in Massachusetts and half in Missouri. BLS selected the sample of establishments, developed the test procedures, and provided some training to OSHA staff in the procedures to be used in record checking. OSHA compliance officers, who have the legal authority to inspect medical records, conducted the onsite record checks. BLS reviewed and evaluated the test results.

Each onsite check at the sampled establishment consisted of four parts:

- Interviews with the recordkeeper regarding practices for recording work injuries and illnesses (forms used, etc.) and the manner in which the process took place.
- Questioning of recordkeepers about the definitions and concepts associated with the recordkeeping requirements.
- Reconstruction of the establishment's *OSHA Log and Summary of Occupational Injuries and Illnesses* from other records when available, and comparison with the original log.
- Interviews with employees to (1) determine worker awareness of the injury and illness records, and (2) obtain additional information about injuries and illnesses at the establishment.

The project was intended to test a procedure and to determine the cost in inspectors' time; it was *not* designed to provide statistical results that could be generalized to the economy as a whole. Only a small number of establishments (nearly 200) were visited and about 4,000 injury and illness recordings were examined. The discussion that follows reflects only the experience of the establishments in the test; no conclusions can be drawn from them about the accuracy of all employer records.

Record review results

Many private sector employers, including the 192 establishments in this test, must complete two OSHA records when an occupational injury or illness occurs. The first is a one-line entry on the log (OSHA Form No. 200), which also has to be included in the log's yearend summary total. A more detailed supplementary record (OSHA Form No. 101) provides worker characteristics and a description of the inci-

dent, with additional information on the nature of the injury or illness. State workers' compensation forms may be substituted for the OSHA 101 and frequently are.

Nearly 90 percent of the 192 establishments visited kept the OSHA log; virtually every one of them had supplementary records for the injuries and illnesses on the log. Twelve employers who had no recordable cases kept no log. Nine other employers, most of whom had fewer than 10 recordable cases, did not keep a log.

In most instances (about 80 percent), the recordkeepers interviewed said that they had entered recordable cases on the log within the 6 working days requirement. About 70 percent of the establishments reported that they posted the yearend summary at the workplace as required during the month of February.

Decisions on the recordability of cases were made by management in slightly more than two-fifths of the establishments, and by other business professionals at about three-tenths of the workplaces. Decisions were made less often by clerical employees (one-sixth) and by medical professionals (less than one-tenth).

In the test, OSHA compliance officers found that they were able to question the person who actually kept the records about the definitions used. A special effort at more intensive questioning would be required to test the recordkeeper's understanding of the guidelines, however, and this was outside the scope of the pilot project.

Procedures for evaluating the log

The main purpose of the pilot effort was to test methods for evaluating the employer's log. Reviewers were instructed to access the OSHA Supplementary Record, workers' compensation reports, daily reports of injuries and illnesses, employee medical records, company accident reports, and other insurance records. From these sources, the reviewer was to independently "reconstruct" the log for 1986 and then compare the reconstructed log with the original kept by the employer. The reviewer was to discuss any differences with the employer to obtain additional information to assist in understanding any discrepancies that might be found.

In the 192 establishments visited, employers recorded nearly 4,000 cases on their logs for 1986. OSHA reviewers found *overrecording* in 15 percent of these cases, that is, the employer recorded cases that, under the BLS Recordkeeping Guidelines for Occupational Injuries and Illnesses,[1] were not supposed to be recorded. On the other hand, *underrecording*, that is, recordable cases that were not entered on the logs, were found in about one-fifth of the total recordable cases in these companies. Virtually all of the overrecording involved cases with no lost worktime, whereas the undercounted injuries and illnesses were about equally split between those with no lost worktime and those involving lost workdays. Overall, lost workday cases were underrecorded by about one-fourth in these establishments. Some of this underrecording was due to employers entering lost workday cases on their logs as no-lost-time cases. Conversely, injuries and illnesses without lost workdays were overrecorded by nearly one-fifth.

Overall, the lost workdays associated with lost workday cases were undercounted by almost one-fourth. Nearly half of the undercounted days were found in 55 long-term cases. In addition, about one-half of the lost workdays undercount involved days of restricted work activity. Restricted work activity is the inability to perform normal job duties during a work shift rather than actual absence from work.

Only one case resulting in a fatality was found during the review, and it was accurately recorded on the log.

Employee interviews

The employee interview portion of the project had two purposes: (1) to test a method for obtaining information from employees concerning their awareness of and participation in the recording process, and (2) to learn if employees knew of any cases that should have been on the log but had not been recorded.

About 1,250 employees were interviewed—about 4 in every 100 employed in the 192 establishments. Although 70 percent of the establishments reported that a summary of the log had been posted as required in the workplace, only about 2 out of 5 of the interviewed workers recalled having seen it. A few employees reported having seen the log on other occasions, such as during safety meetings. Although employees have the right to see the log upon request, only one of those interviewed had initiated such a request.

Virtually all of the employees contacted who had experienced work-related injuries or illnesses told OSHA interviewers that they had reported them to their employer, but it was not possible in many cases to determine whether some of the injuries, especially those with no lost workdays, were recordable. The employees did, however, identify 221 lost-time injuries and illnesses that reviewers confirmed to be recordable. All but 29 of these had been listed on the log, although not always as lost-time cases.

There were several instances in which a 1985 event was reported by an employee as having occurred in 1986, indicating a telescoping of time in the recall process. In addition, some employees were unable to identify all of their 1986 injuries and illnesses.

Summary and evaluation

The major objective of the test was achieved in that the reviewers were generally able to access medical records and other supplementary information to permit an evaluation of the logs. A second objective was to determine the cost in resource time to carry out the plan. As indicated, nearly 200 establishments were visited, and about 1,250 workers were interviewed. Although the procedures had been carefully designed to minimize use of resources, the process proved to consume considerable resources. The establishment

records check—the record reviews, interviews, related compliance activities, and followup work outside the establishment—took OSHA compliance officers an average of 40 hours (5 workdays) per establishment to complete. The reconstruction of the employer log was the most time-consuming part of the process.

The lack of employee listings, absenteeism, and different work shifts made it difficult at times to select or contact employees. In some situations, employees who were injured or ill in 1986 were intentionally selected for interview to provide more information on their 1986 cases. Experience with these employee interviews and those with people responsible for keeping the employer log, while useful, suggests the need for further research on ways to expand the detail requested and to ensure full understanding of the questions asked.

—— *FOOTNOTE* ——

ACKNOWLEDGMENT: The records checks were planned and conducted by the following OSHA area office personnel: Mary Gayle, Warren Huse, William Lander, Frank Pagliuca, and Marie Sullivan in Massachusetts; and Ted Bach, Sandra Jenkins, Diana Lee Gandy, Jean Marshall, and Mary Wehmeier in Missouri. Joanne Goodell, of the OSHA Policy Directorate directed the program. The following staff members in the BLS Office of Safety, Health, and Working Conditions contributed to the development, processing, and analysis of the results of the project: Stephen Newell, Robert Moore, Elyce Biddle, Maryrose Cline-Buso, and Janice Windau.

[1] The BLS guidelines provide interpretation of the recordkeeping requirements of the Occupational Safety and Health Act of 1970 and Title 29, Pt. 1904, of the Code of Federal Regulations.

A movable beast: changing patterns of regional unemployment

RICHARD M. DEVENS, JR.

At yearend 1987, the current expansion reached 61 months, the longest peacetime expansion on record. From the recession trough in November 1987, employment rose by about 14.6 million, the number of jobless fell by almost 5 million, and the unemployment rate dropped from 10.8 percent to 5.8 percent.

As in other years, there were wide differences in the incidence of unemployment among the State and regional labor markets in 1987. New Hampshire had the lowest average rate of unemployment for the year—2.6 percent—while Louisiana, West Virginia, Alaska, and Mississippi had unemployment rates in double digits. On a regional basis, New England reported the lowest unemployment rate—3.4 percent. In contrast, the West South Central division, which includes Louisiana, saw 8.9 percent of its labor force jobless.

Over the last decade or so, the relative situations of the regions have shifted considerably. In the mid-1970's, higher-than-average unemployment rates were basically a bicoastal phenomenon. In 1976, the Northeast census region—which includes New England—and the West Coast States—especially California and Washington—had much more severe unemployment problems than the geographic center of the country.[1] (See table 1.) Much was made at the time of intractable structural economic problems: "the frostbelt," the presumed obsolescence of the Northeastern industrial base, the changing demographics of the West Coast's growing labor force, and the migration of manufacturing employment to the expanding South and Southwest.

Following the recessions of the early 1980's, however, a significantly different regional pattern of unemployment began to emerge. In 1983, relatively high unemployment rates[2] were concentrated in a broad band of Eastern and Central States. (See chart 1.) Structural decline was still evident in the labor markets of the traditionally industrial East North Central division, but the effect of recession on manufacturing jobs also took a toll on the more newly industrialized East South Central States of Alabama, Kentucky, Mississippi, and Tennessee. Louisiana also experienced high unemployment, as oil prices declined and high-cost exploration and production ventures in the Gulf of Mexico were curtailed.

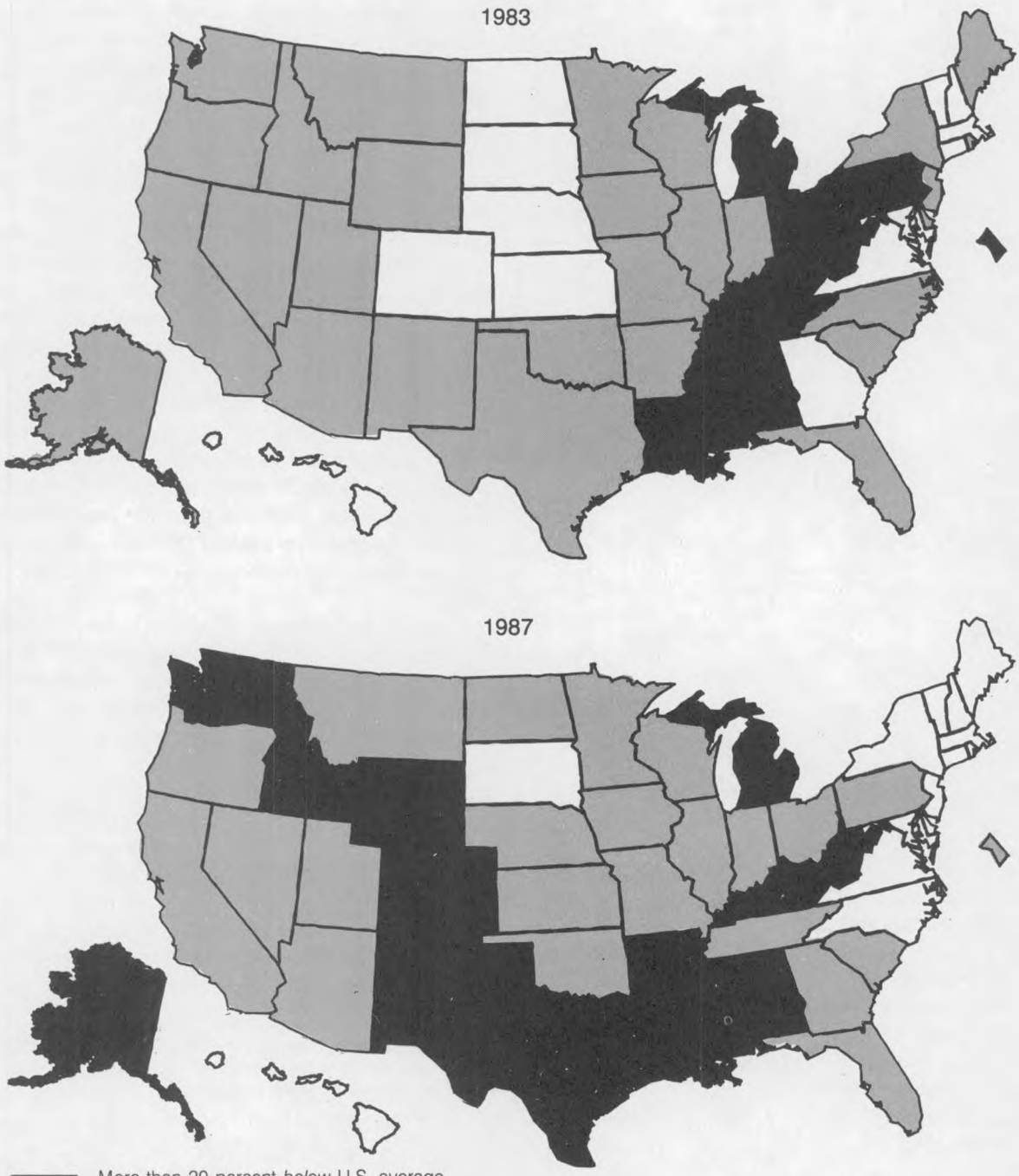
In 1986, the fourth year of recovery, another pattern of regional unemployment rates started to become apparent. The New England States had all moved to the low-unemployment group, and several of the East North Central States had unemployment rates fairly close to the improving national average.

By 1987, the new pattern was more clearly developed. The geographic axis of relatively high unemployment had shifted from North-South to basically East-West. (See chart 1.) The northeastern States, by now including New York, a beneficiary of a rapid buildup in financial services, and New Jersey, well-positioned as a transportation services and regional retailing center, had jobless rates well below the national level. The coastal States in the northern tier of the South Atlantic division were also in good shape. State unemployment rates 20 percent or more above the national average of 6.2 percent started in West Virginia and Kentucky and broadened through the West South Central division, before sweeping out to Washington State by way of Colorado, Wyoming, and Idaho. High unemployment thus was largely concentrated in States whose economies were most dependent on energy production. California, in contrast to its position a decade before, was now among the States with near-average unemployment.

Over the current 5-year expansion, the relative dispersion of State unemployment rates has increased, which, on the surface suggests a trend toward polarization of State

Richard M. Devens, Jr., is an economist in the Division of Labor Force Statistics, Bureau of Labor Statistics.

Chart 1. State unemployment rates, 1983 and 1987



NOTE: U.S. average unemployment rate was 9.6 percent in 1983 and 6.2 percent in 1987.

Table 1. Unemployment rates by State, selected years, 1976–87

State	1976	1983	1986	1987
Alabama	6.8	13.7	9.8	7.8
Alaska	8.0	10.3	10.8	10.8
Arizona	9.8	9.1	6.9	6.2
Arkansas	7.1	10.1	8.7	8.1
California	9.2	9.7	6.7	5.8
Colorado	5.9	6.6	7.4	7.7
Connecticut	9.5	6.0	3.8	3.3
Delaware	8.9	8.1	4.3	3.2
District of Columbia	9.1	11.7	7.7	6.3
Florida	9.0	8.6	5.7	5.3
Georgia	8.1	7.5	5.9	5.5
Hawaii	9.8	6.5	4.8	3.8
Idaho	5.7	9.8	8.7	8.0
Illinois	6.5	11.4	8.1	7.4
Indiana	6.1	11.1	6.7	6.4
Iowa	4.0	8.1	7.0	5.5
Kansas	4.2	6.1	5.4	4.9
Kentucky	5.6	11.7	9.3	8.8
Louisiana	6.8	11.8	13.1	12.0
Maine	8.9	9.0	5.3	4.4
Maryland	6.8	6.9	4.5	4.2
Massachusetts	9.5	6.9	3.8	3.2
Michigan	9.4	14.2	8.8	8.2
Minnesota	5.9	8.2	5.3	5.4
Mississippi	6.6	12.6	11.7	10.2
Missouri	6.2	9.9	6.1	6.3
Montana	6.1	8.8	8.1	7.4
Nebraska	3.3	5.7	5.0	4.9
Nevada	9.0	9.8	6.0	6.3
New Hampshire	6.4	5.4	2.8	2.5
New Jersey	10.4	7.8	5.0	4.0
New Mexico	9.1	10.1	9.2	8.9
New York	10.3	8.6	6.3	4.9
North Carolina	6.2	8.9	5.3	4.5
North Dakota	3.6	5.6	6.3	5.2
Ohio	7.8	12.2	8.1	7.0
Oklahoma	5.6	9.0	8.2	7.4
Oregon	9.5	10.8	8.5	6.2
Pennsylvania	7.9	11.8	6.8	5.7
Rhode Island	8.1	8.3	4.0	3.8
South Carolina	6.9	10.0	6.2	5.6
South Dakota	3.4	5.4	4.7	4.2
Tennessee	6.0	11.5	8.0	6.6
Texas	5.7	8.0	8.9	8.4
Utah	5.7	9.2	6.0	6.4
Vermont	8.7	6.9	4.7	3.6
Virginia	5.9	6.1	5.0	4.2
Washington	8.7	11.2	8.2	7.6
West Virginia	7.5	18.0	11.8	10.8
Wisconsin	5.6	10.4	7.0	6.1
Wyoming	4.1	8.4	9.0	8.6

performance. However, such a pattern is typical, reflecting an arithmetic process that may be illustrated by a simple example. Assume that the national unemployment rate is 10 percent at some time and over the course of the next year every State's jobless rate falls by 5 points. The national rate will then improve to roughly 5 percent, but the standard deviation of the State rates will not change and the ratio of that figure to the national rate, the "coefficient of variation,"—a statistical measure of relative dispersion—will actually *increase*.

Although this helps explain why the relative dispersion of State unemployment rates seems larger in the recent years that have been part of a prolonged recovery, there still remains the challenging task of explaining the differences among the levels of State unemployment rates. In efforts to reduce the problem to its elements, analysts have often concentrated on industry mix and economic shock factors.[3] The rapidly changing pattern of State and regional unemployment rates described in this article suggests that the differentials are clearly not a function of relatively stable differences in regional attributes, such as industry distribution or demographics, but rather of a fairly rapidly changing economic environment. For example, Rhode Island and Massachusetts are neighboring States with unemployment rates that are now well below the Nation's. Both were near the top of the table in 1976, and both have been part of the general resurgence of the New England economy. But, their industry distributions and policy mixes are quite different. Massachusetts is the prototypical high-tech State combined with a strong regional financial services center, while Rhode Island has much of its work force engaged in such relatively low-wage, traditional manufacturing industries as apparel and jewelry.[4] While Massachusetts has experimented with broad business development programs on the part of the State government, the citizens of Rhode Island explicitly rejected such a comprehensive approach in a 1984 referendum.

From this example, and the dramatic changes in the spatial patterns of State unemployment outlined earlier, one might conclude that tomorrow's winner cannot easily be projected from today's characteristics, policies, or leadership position.

——*FOOTNOTES*——

[1] Susan Elizabeth Shank, "Changes in regional unemployment over the last decade," *Monthly Labor Review*, March 1985, pp. 17–23. The current paper is essentially an update of Shank's more detailed article.

[2] States with unemployment rates 20 percent or more lower than that year's national rate are unshaded in the chart accompanying this article. States with unemployment rates 20 percent or more above the Nation's are shaded black. States whose jobless rates are within 20 percent of the national figure are gray.

[3] Philip L. Rones, "An analysis of regional employment growth, 1937–85," *Monthly Labor Review*, June 1986, pp. 4–13. Rones' comments and references concerning shift-share analysis, the impact of migration, and the role of economic shocks are especially useful.

[4] Howard Kurtz, "Rhode Island: Rags to Riches," *The Washington Post*, Feb. 8, 1988.

Major Agreements Expiring Next Month

This list of selected collective bargaining agreements expiring in May is based on information collected by the Bureau's Office of Compensation and Working Conditions. The list includes agreements covering 1,000 workers or more. Private industry is arranged in order of Standard Industrial Classification.

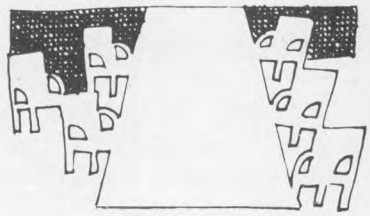
Industry or activity	Employer and location	Labor organization[1]	Number of workers
Private			
Construction	Associated General Contractors of Massachusetts and one other (Massachusetts)	Laborers	6,000
	Builders Association of Chicago (Illinois)	Bricklayers	5,000
	Mid-America Regional Bargaining Association (Chicago, IL)	Carpenters	12,000
	Southwestern Michigan Contractors Association (Michigan)	Laborers	1,400
	Omaha Building Contractors Employers Association (Nebraska)	Laborers	1,700
	Calumet Builders Association (Gary, IN)	Carpenters	2,400
	Associated General Contractors, Oregon-Columbia Chapter (Oregon and Washington)	Operating Engineers	2,000
	Mid-America Regional Bargaining Association, heavy and highway (Chicago, IL)	Operating Engineers	1,000
	Building Trades Employers Association (Syracuse, NY)	Laborers	1,000
	Construction Industries of Massachusetts, Inc., heavy and highway (Massachusetts)	Laborers	4,000
	Wisconsin Road Builders Association (Wisconsin)	Laborers	1,000
	Associated General Contractors, Oregon-Columbia Chapter (Oregon and Washington)	Carpenters	6,000
	Associated General Contractors, building, highway and tunnel (Arizona)	Operating Engineers	6,000
	Boilermakers Employers Association of Western Pennsylvania (Pennsylvania)	Boilermakers	1,200
	Ironworkers Employers Association of Western Pennsylvania (Pennsylvania)	Iron Workers	1,500
	Mechanical Contractors Association of Western Pennsylvania (Pennsylvania)	Plumbers	1,200
	Sheet Metal Contractors Association (Chicago, IL)	Sheet Metal Workers	4,000
	Painting and Decorating Contractors of America (Chicago, IL)	Painters	6,000
	Associated Steel Erectors of Chicago (Illinois)	Iron Workers	1,750
	Electrical Contractors Association of the City of Chicago (Illinois)	Electrical Workers (IBEW)	11,000
	Plumbing Contractors Association of Chicago and Cook County (Illinois)	Plumbers	5,400
	Mechanical Contractors Association (Chicago, IL)	Plumbers	7,000
	Sheet Metal Employers Association (Detroit, MI)	Sheet Metal Workers	2,000
	National Electrical Contractors Association (Milwaukee, WI)	Electrical Workers (IBEW)	1,300
	Chicago Roofing Contractors Association (Illinois)	Roofers	2,400
	National Electrical Contractors Association (San Francisco, CA)	Electrical Workers (IBEW)	2,500
	National Electrical Contractors Association (Colorado)	Electrical Workers (IBEW)	1,800
	Contract Administration Fund of Northeastern Colorado and one other (Colorado)	Plumbers	1,400
	National Electrical Contractors Association (Seattle, WA)	Electrical Workers (IBEW)	1,300
Food products	Campbell Soup Co. (Sacramento, CA)	Teamsters	1,400
Tobacco	American Tobacco Co. (North Carolina)	Bakery, Confectionery and Tobacco Workers	2,400
Textiles	Knitted Outerwear Manufacturers Association (Pennsylvania)	Ladies' Garment Workers	4,000
	J. P. Stevens & Co. (Roanoke Rapids, NC)	Clothing and Textile Workers	3,500
Apparel	New York Coat and Suit Association and others (Interstate)	Ladies' Garment Workers	15,000
	Cotton Dress and Juvenile Apparel Association (New York, NY)	Ladies' Garment Workers	2,000
	Affiliated Dress Association Manufacturers Inc. (Interstate)	Ladies' Garment Workers	20,000
	National Association of Blouse Manufacturers Inc. (Interstate)	Ladies' Garment Workers	3,300
	New England Sportswear Manufacturers Association (Boston and vicinity, MA)	Ladies' Garment Workers	2,000
	New England Clothing and Rainwear Manufacturers Association (Boston, MA)	Ladies' Garment Workers	2,000

See footnote at end of table.

Industry or activity	Employer and location	Labor organization[1]	Number of workers
	New England Apparel Manufacturers Association (Fall River, MA)	Ladies' Garment Workers	3,200
	Greater Blouse, Skirt and Undergarment Association (New York, NY)	Ladies' Garment Workers	19,900
	United Knitwear Manufacturers League (New York, NY)	Ladies' Garment Workers	3,800
	National Skirt and Sportswear Association, Inc. (New York, NY)	Ladies' Garment Workers	1,650
	National Women's Neckwear and Scarf Association, Inc. (New York, NY)	Ladies' Garment Workers	1,100
	Atlantic Apparel Contractors Association (Pennsylvania)	Ladies' Garment Workers	25,000
	Infants' and Children's Coat Association (New York, NY)	Ladies' Garment Workers	4,000
	Association of Garment Contractors, ladies sportswear (Boston, MA)	Ladies' Garment Workers	4,500
Lumber	Roseburg Lumber Co. (Oregon)	Carpenters and Woodworkers	2,800
	Western States Wood Products Employers Association (Interstate)	Carpenters and Woodworkers	34,000
	Weyerhaeuser Co. (Interstate)	Various unions	7,500
	Simpson Lumber Co. (Interstate)	Various unions	1,350
Paper	Nekoosa-Edwards Paper Co. (Nekoosa and Port Edwards, WI)	Paperworkers	1,500
Chemicals	E. R. Squibb and Sons, Inc. (New Brunswick, NJ)	Oil, Chemical and Atomic Workers	1,300
Stone, clay, and glass products	American Standard, Inc. (Interstate)	Glass, Pottery, Plastics	1,100
Fabricated metal products	The Stanley Works (New Britain, CT)	Machinists	2,100
Machinery	Ingersoll-Rand Co. (Painted Post, NY)	Electrical Workers (IUE)	1,000
	Tecumseh Products Co. (Tecumseh, MI)	United Products Workers (Ind.)	1,300
	Carrier Corp. (Morrison, TN)	Sheet Metal Workers	1,250
Electrical products	Magnavox Co. (Fort Wayne, IN)	Industrial Workers	1,600
	Whirlpool Corp. (St. Joseph, MI)	Machinists	1,200
Transportation equipment	Avco Corp., Lycoming Division (Stratford, CT)	Auto Workers	2,000
	Dana Corp., Weatherhead Division (Indiana and Ohio)	Auto Workers	1,200
Trucking	National Master Automobile Transporters Agreement (Interstate)	Teamsters	21,000
	Garment Industry Trucking Associations (New York and New Jersey)	Ladies' Garment Workers	2,200
Communication	Hawaii Telephone Co. (Hawaii)	Electrical Workers (IBEW)	3,200
Utilities	Houston Lighting and Power Co. (Texas)	Electrical Workers (IBEW)	4,600
	Northern Indiana Public Service Co. (Indiana)	Steelworkers	3,700
	Public Service Co. of Indiana, Inc. (Indiana)	Electrical Workers (IBEW)	1,800
	Panhandle Eastern Pipe Line Co. (Interstate)	Oil, Chemical and Atomic Workers	1,200
Wholesale trade	Industrial Employers and Distributors Association (California)	Teamsters and Longshoremen and Warehousemen	25,000
Retail trade	First National Stores, Inc. (Connecticut)	Food and Commercial Workers	4,050
	Star Markets (Rhode Island and Massachusetts)	Food and Commercial Workers	1,200
Services	Master Laundry Agreement (Michigan)	Teamsters	1,100

[1] Affiliated with AFL-CIO except where noted as independent (Ind.).

Developments in Industrial Relations



Oil, coal settlements

Possible interruptions in the Nation's energy supply were averted when the Oil, Chemical and Atomic Workers (OCAW) settled with petroleum refining and distributing companies, and the United Mine Workers settled with bituminous coal producers. The round of OCAW settlements, which follwed the terms of a lead-off accord with American Oil Co., did result in brief work stoppages over local issues at a few refineries, but the impact was minimal as management employees kept the highly automatic facilities in operation. In soft coal, there were union threats of work stoppages at a few companies that were not members of the Bituminous Coal Operators Association, the industry's bargaining leader, but the stoppages were averted when the independent producers accepted the same terms as the Association. (Before the Mine Workers-Bituminous Coal Operators Association settlement, other independents had signed interim "me too" agreements prohibiting work stoppages by Mine Workers members and pledging the companies to accept the same terms as the Association.)

The American Oil-OCAW contract included a $900 lumpsum payment to employees upon ratification, a 30-cent-an-hour wage increase effective February 1, and a 3-percent increase in February 1989. Amoco also agreed to increase its financing of health insurance by $10 a month for family coverage in the first year and by $2 in the second year. The contract covered 4,000 workers.

The wage and benefit terms of the American Oil-OCAW settlement were expected to eventually apply to about 40,000 workers covered by 300 contracts with 60 companies. Among the first companies to settle on pattern contracts were Atlantic Richfield Co., Ashland Oil Inc., Shell Oil Co., Union Oil Co., and Conoco Inc.

The coal contract is effective for 5 years, compared with 40 months for the 1984 contract and the usual 3 years for earlier contracts. According to Mine Workers President Richard Trumka, the contract emphasized job opportunities for union members, as there were about 30,000 members on layoff and about 60,000 still working in the soft coal fields at the time of the settlement. The economic difficulties for Mine Workers members and their employers are generally attributed to plentiful supplies of moderate cost petroleum and to growing coal production in western open pit mines, where employees are generally nonunion, or members of other unions.

Under the new job opportunity provisions, laid-off Mine Workers members gained

- The right to the first three of every five jobs available at nonunion operations of companies that have other operations covered by the contract.
- The right to all jobs in operations that their employer leases out to other companies.
- The right to "panel" (apply their recall rights) at all of their employer's operations. (Previously, laid-off workers could only panel the company's operations in the Mine Workers district in which the job was located or in one contiguous district.
- New training and education programs financed by employer payments which the union expects to total $20 million over the contract term.

Economic provisions of the agreement included hourly wage increases of 25 cents on February 1, 1988, 35 cents on February 1, 1989, and 45 cents on February 1, 1990, bringing the top rate for an underground miner to $16.615 an hour, or $132.92 a day. The union also has the option to reopen bargaining on wages and pensions after the third and fourth contract years.

Pension changes already adopted include increases for those who began drawing benefits prior to December 6, 1974: a $40 a month increase for normal retirees with 20 years' service, bringing their monthly benefits to $375; a $40 increase for disability retirees, bringing their monthly benefits to 217.50; and a $20 increase for surviving spouses, bringing their benefits to $125.

For those who began drawing benefits after December 5, 1974, but prior to the February 1, 1988, effective date of the new contract—under a separate plan providing for graduated benefit levels based on years of service and age at retirement—the increases were a flat $30 a month for normal and disability retirees, and for surviving spouses was raised to 75 percent (formerly 50 percent) of the amount the retiree had been receiving.

All steps of the graduated formula for employees retiring on normal pension during the contract term also were increased. The new maximum is $32 a month for each year of service after February 1, 1990, for workers retiring at age 62. Previously, the maximum for age 62 retirees was $18.50 for each year of service in excess of 30.

"Developments in Industrial Relations" is prepared by George Ruben of the Division of Developments in Labor-Management Relations, Bureau of Labor Statistics, and is largely based on information from secondary sources.

Employees who retire during the first 2 years of the contract as a result of mine accidents will receive a monthly benefit of at least $190 and those who retire in the third year will receive at least $200. (They will recieve a normal pension if it amounts to more than the $190 or $200 minimum.) The previous minimum was $170 a month. For surviving spouses, the benefit was raised to 75 percent (formerly 50 percent) of the deceased person's entitlement.

The accord also provided for a retirement savings plan under provision 401(k) of the Internal Revenue Code, allowing employees to invest up to 10 percent of their earnings, with taxes on the investment and any resulting gains deferred until the participant withdraws money from the fund. Other terms included a $1,000 increase in the death benefit to the beneficiary of deceased pensioners; a $20 increase in sickness and accident benefits, to $220 a week; a $5,000 increase in the employees' $30,000 life insurance coverage for natural death and a $10,000 increase in their 60,000 coverage for accidental death; and a $10 increase in the $170 annual clothing allowance.

Honeywell consolidates seniority groups

In Minneapolis, MN, 6,300 employees of Honeywell Inc.'s electronic products plant were covered by a 2-year contract negotiated by Local 1145 of the Teamsters union. The accord provided for a single pay increase, 4 percent, effective immediately. Initially, Honeywell had proposed a 3-year wage freeze.

Another major issue was resolved when the parties agreed to increase the employees' share of monthly hospital-medical-surgical insurance premiums to $13.25, from $9.25, for single workers and to $26.50, from $18.50, for married workers. The plan will continue to cover all fees and charges (the company withdrew its proposal that employees pay up to $3,000 a year in coinsurance and deductibles).

The separate 4-year pension agreement raised the benefit rate for current employees to $25 a month, from $22, for each year of credited service. There also was a $1 increase in the rates for current retirees.

The other important contract change was consolidation of 42 separate seniority groups into one, which the company proposed to increase flexibility in work assignments. According to the union, employees in danger of layoff will also benefit because they will be able to bid on a much larger number of jobs, if they have the required skills. Honeywell also agreed to pay guarantees of up to 1 year for employees who lose jobs or are bumped into lower paying jobs. The company guaranteed that employees will not be laid off as a result of production increases resulting from the new system.

Yale settlement averts planned stoppage

In New Haven, CT, Yale University settled with two locals of the Hotel Employees and Restaurant Employees, averting a planned work stoppage involving 3,600 employees. One of the unions represents clerical and technical workers, and the other, food service and maintenance workers. The 4-year agreement, the longest ever negotiated by Yale, provided for 6-percent annual pay increases.

Another feature of the settlement was a restructuring of the job classifications systems, which the union contended had led to "economic discrimination" against women and minority group members because pay rates were too closely grouped and supervisors' assignment of employees to grades was arbitrary. Under the new system, the number of grades was reduced and supervisors will have less discretion in writing job descriptions.

Other provisions gave Yale more freedom in subcontracting work and increased training courses for employees.

Both sides said that they hoped that the accord signaled a reversal of the turbulent bargaining relationship of the past 20 years, which was marked by five work stoppages, including a 10-week stoppage in 1984.

Safety program revamped at Bath Iron Works

Labor relations at Bath Iron Works took a turn for the better when the shipbuilding firm and three unions cooperated in a revamping of the safety program that boded well for mid-1988 bargaining on wages and benefits, in contrast with 1985, when a 3-month work stoppage occurred.

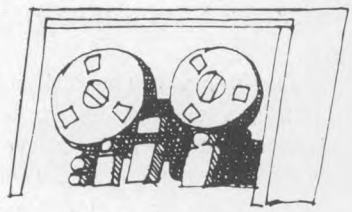
In signing the new safety agreement, union and management representatives expressed hope that the revamping would convince the Department of Labor's Occupational Safety and Health Administration of their commitment to safety and lead to a reduction of the record $4.2 million fine OSHA had proposed for Bath in October 1987 after finding more than 3,000 alleged violations constituting a "serious threat" to employees.

Regardless of the outcome of the continuing legal action against the company, both management and the unions said the safety agreement would stand. The 37-point agreement, which was expected to cost Bath $6 million over its 3-year term, called for:

- Hiring a qualified director of safety.
- Hiring 16 safety inspectors and laboratory employees.
- Establishing a joint safety committee.
- Discontinuing the safety awards program and reviewing possible alternatives.
- Substantially modifiying work sites and equipment to reduce dangers.
- Sending firefighters to OSHA training programs.
- Training safety department employees in assuring compliance with OSHA regulations.
- Developing plans for in-house safety inspections at least every 3 months at the three facilities, which are located in Maine.
- Inviting OSHA to conduct a complete inspection in 1990.

The unions involved in the settlement were the Marine and Shipbuilding Workers, the Marine Draftsmen's Association, and the Independent Guards Association. □

Current Labor Statistics



Contents—Continued

Schedule of release dates for BLS statistical series

Series	Release date	Period covered	Release date	Period covered	Release date	Period covered	MLR table number
Employment situation	April 1	March	May 6	April	June 3	May	1; 4–21
Producer Price Index	April 15	March	May 13	April	June 10	May	2; 33–35
Consumer Price Index	April 20	March	May 20	April	June 21	May	2; 30–32
Real earnings	April 20	March	May 20	April	June 21	May	14–17
Major collective bargaining settlements	April 26	1st quarter	.....	.....	.....	.....	3, 25–28
Employment Cost Index	April 26	1st quarter	.....	.....	.....	.....	1–3; 22–24
U.S. Import and Export Price Indexes	April 28	1st quarter	.....	.....	.....	.....	36–41
Productivity and cost: Nonfarm business and manufacturing	.....	.....	May 2	1st quarter	.....	.....	2; 42–44
Nonfinancial corporations	.....	.....	.....	.....	June 6	1st quarter	2; 42–44

NOTES ON CURRENT LABOR STATISTICS

This section of the *Review* presents the principal statistical series collected and calculated by the Bureau of Labor Statistics: series on labor force, employment, unemployment, collective bargaining settlements, consumer, producer, and international prices, productivity, international comparisons, and injury and illness statistics. In the notes that follow, the data in each group of tables are briefly described, key definitions are given, notes on the data are set forth, and sources of additional information are cited.

General notes

The following notes apply to several tables in this section:

Seasonal adjustment. Certain monthly and quarterly data are adjusted to eliminate the effect on the data of such factors as climatic conditions, industry production schedules, opening and closing of schools, holiday buying periods, and vacation practices, which might prevent short-term evaluation of the statistical series. Tables containing data that have been adjusted are identified as "seasonally adjusted." (All other data are not seasonally adjusted.) Seasonal effects are estimated on the basis of past experience. When new seasonal factors are computed each year, revisions may affect seasonally adjusted data for several preceding years. (Seasonally adjusted data appear in tables 1–3, 4–10, 13, 14, 17, and 18.) Beginning in January 1980, the BLS introduced two major modifications in the seasonal adjustment methodology for labor force data. First, the data are seasonally adjusted with a procedure called X–11 ARIMA, which was developed at Statistics Canada as an extension of the standard X–11 method previously used by BLS. A detailed description of the procedure appears in *The X–11 ARIMA Seasonal Adjustment Method* by Estela Bee Dagum (Statistics Canada, Catalogue No. 12–564E, February 1980). The second change is that seasonal factors are calculated for use during the first 6 months of the year, rather than for the entire year, and then are calculated at midyear for the July-December period. However, revisions of historical data continue to be made only at the end of each calendar year.

Seasonally adjusted labor force data in tables 1 and 4–10 were revised in the February 1988 issue of the *Review*, to reflect experience through 1987.

Annual revisions of the seasonally adjusted payroll data shown in tables 13, 14, and 18 were made in the July 1987 *Review* using the X–11 ARIMA seasonal adjustment methodology. New seasonal factors for productivity data in table 42 are usually introduced in the September issue. Seasonally adjusted indexes and percent changes from month to month and from quarter to quarter are published for numerous Consumer and Producer Price Index series. However, seasonally adjusted indexes are not published for the U.S. average All Items CPI. Only seasonally adjusted percent changes are available for this series.

Adjustments for price changes. Some data—such as the Hourly Earnings Index in table 17—are adjusted to eliminate the effect of changes in price. These adjustments are made by dividing current dollar values by the Consumer Price Index or the appropriate component of the index, then multiplying by 100. For example, given a current hourly wage rate of $3 and a current price index number of 150, where 1977 = 100, the hourly rate expressed in 1977 dollars is $2 ($3/150 × 100 = $2). The $2 (or any other resulting values) are described as "real," "constant," or "1977" dollars.

Additional information

Data that supplement the tables in this section are published by the Bureau in a variety of sources. News releases provide the latest statistical information published by the Bureau; the major recurring releases are published according to the schedule preceding these general notes. More information about labor force, employment, and unemployment data and the household and establishment surveys underlying the data are available in *Employment and Earnings*, a monthly publication of the Bureau. More data from the household survey are published in the two-volume data book—*Labor Force Statistics Derived From the Current Population Survey*, Bulletin 2096. More data from the establishment survey appear in two data books—*Employment, Hours, and Earnings, United States*, and *Employment, Hours, and Earnings, States and Areas*, and the annual supplements to these data books. More detailed information on employee compensation and collective bargaining settlements is published in the monthly periodical, *Current Wage Developments*. More detailed data on consumer and producer prices are published in the monthly periodicals, *The CPI Detailed Report*, and *Producer Prices and Price Indexes*. Detailed data on all of the series in this section are provided in the *Handbook of Labor Statistics*, which is published biennally by the Bureau. BLS bulletins are issued covering productivity, injury and illness, and other data in this section. Finally, the *Monthly Labor Review* carries analytical articles on annual and longer term developments in labor force, employment, and unemployment; employee compensation and collective bargaining; prices; productivity; international comparisons; and injury and illness data.

Symbols

p = preliminary. To increase the timeliness of some series, preliminary figures are issued based on representative but incomplete returns.
r = revised. Generally, this revision reflects the availability of later data but may also reflect other adjustments.
n.e.c. = not elsewhere classified.
n.e.s. = not elsewhere specified.

COMPARATIVE INDICATORS
(Tables 1–3)

Comparative indicators tables provide an overview and comparison of major BLS statistical series. Consequently, although many of the included series are available monthly, all measures in these comparative tables are presented quarterly and annually.

Labor market indicators include employment measures from two major surveys and information on rates of change in compensation provided by the Employment Cost Index (ECI) program. The labor force participation rate, the employment-to-population ratio, and unemployment rates for major demographic groups based on the Current Population ("household") Survey are presented, while measures of employment and average weekly hours by major industry sector are given using nonagricultural payroll data. The Employment Cost Index (compensation), by major sector and by bargaining status, is chosen from a variety of BLS compensation and wage measures because it provides a comprehensive measure of employer costs for hiring labor, not just outlays for wages, and it is not affected by employment shifts among occupations and industries.

Data on **changes in compensation, prices, and productivity** are presented in table 2. Measures of rates of change of compensation and wages from the Employment Cost Index program are provided for all civilian nonfarm workers (excluding Federal and household workers) and for all private nonfarm workers. Measures of changes in: consumer prices for all urban consumers; producer prices by stage of processing; and the overall export and import price indexes are given. Measures of productivity (output per hour of all persons) are provided for major sectors.

Alternative measures of wage and compensation rates of change, which reflect the overall trend in labor costs, are summarized in table 3. Differences in concepts and scope, related to the specific purposes of the series, contribute to the variation in changes among the individual measures.

Notes on the data

Definitions of each series and notes on the data are contained in later sections of these notes describing each set of data. For detailed descriptions of each data series, see *BLS Handbook of Methods,* Volumes I and II, Bulletins 2134–1 and 2134–2 (Bureau of Labor Statistics, 1982 and 1984, respectively), as well as the additional bulletins, articles, and other publications noted in the separate sections of the *Review*'s "Current Labor Statistics Notes." Historical data for many series are provided in the *Handbook of Labor Statistics,* Bulletin 2217 (Bureau of Labor Statistics, 1985). Users may also wish to consult *Major Programs, Bureau of Labor Statistics,* Report 718 (Bureau of Labor Statistics, 1985).

EMPLOYMENT AND UNEMPLOYMENT DATA
(Tables 1; 4–21)

Household survey data

Description of the series

EMPLOYMENT DATA in this section are obtained from the Current Population Survey, a program of personal interviews conducted monthly by the Bureau of the Census for the Bureau of Labor Statistics. The sample consists of about 59,500 households selected to represent the U.S. population 16 years of age and older. Households are interviewed on a rotating basis, so that three-fourths of the sample is the same for any 2 consecutive months.

Definitions

Employed persons include (1) all civilians who worked for pay any time during the week which includes the 12th day of the month or who worked unpaid for 15 hours or more in a family-operated enterprise and (2) those who were temporarily absent from their regular jobs because of illness, vacation, industrial dispute, or similar reasons. Members of the Armed Forces stationed in the United States are also included in the employed total. A person working at more than one job is counted only in the job at which he or she worked the greatest number of hours.

Unemployed persons are those who did not work during the survey week, but were available for work except for temporary illness and had looked for jobs within the preceding 4 weeks. Persons who did not look for work because they were on layoff or waiting to start new jobs within the next 30 days are also counted among the unemployed. The **overall unemployment rate** represents the number unemployed as a percent of the labor force, including the resident Armed Forces. The **civilian unemployment rate** represents the number unemployed as a percent of the civilian labor force.

The **labor force** consists of all employed or unemployed civilians plus members of the Armed Forces stationed in the United States. Persons **not in the labor force** are those not classified as employed or unemployed; this group includes persons who are retired, those engaged in their own housework, those not working while attending school, those unable to work because of long-term illness, those discouraged from seeking work because of personal or job-market factors, and those who are voluntarily idle. The **noninstitutional population** comprises all persons 16 years of age and older who are not inmates of penal or mental institutions, sanitariums, or homes for the aged, infirm, or needy, and members of the Armed Forces stationed in the United States. The **labor force participation rate** is the proportion of the noninstitutional population that is in the labor force. The **employment-population ratio** is total employment (including the resident Armed Forces) as a percent of the noninstitutional population.

Notes on the data

From time to time, and especially after a decennial census, adjustments are made in the Current Population Survey figures to correct for estimating errors during the preceding years. These adjustments affect the comparability of historical data. A description of these adjustments and their effect on the various data series appear in the Explanatory Notes of *Employment and Earnings*.

Data in tables 4–10 are seasonally adjusted, based on the seasonal experience through December 1987.

Additional sources of information

For detailed explanations of the data, see *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 1, and for additional data, *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985). A detailed description of the Current Population Survey as well as additional data are available in the monthly Bureau of Labor Statistics periodical, *Employment and Earnings*. Historical data from 1948 to 1981 are available in *Labor Force Statistics Derived from the Current Population Survey: A Databook*, Vols. I and II, Bulletin 2096 (Bureau of Labor Statistics, 1982).

A comprehensive discussion of the differences between household and establishment data on employment appears in Gloria P. Green, "Comparing employment estimates from household and payroll surveys," *Monthly Labor Review,* December 1969, pp. 9–20.

Establishment survey data

Description of the series

EMPLOYMENT, HOURS, AND EARNINGS DATA in this section are compiled from payroll records reported monthly on a voluntary basis to the Bureau of Labor Statistics and its cooperating State agencies by more than 290,000 establishments representing all industries except agriculture. In most industries, the sampling probabilities are based on the size of the establishment; most large establishments are therefore in the sample. (An establishment is not necessarily a firm; it may be a branch plant, for example, or warehouse.) Self-employed persons and others not on a regular civilian payroll are outside the scope of the survey because they are excluded from establishment records. This largely accounts for the difference in employment figures between the household and establishment surveys.

Definitions

An **establishment** is an economic unit which produces goods or services (such as a factory or store) at a single location and is engaged in one type of economic activity.

Employed persons are all persons who received pay (including holiday and sick pay) for any part of the payroll period including the 12th of the month. Persons holding more than one job (about 5 percent of all persons in the labor force) are counted in each establishment which reports them.

Production workers in manufacturing include working supervisors and all nonsupervisory workers closely associated with production operations. Those workers mentioned in tables 12–17 include production workers in manufacturing and mining; construction workers in construction; and nonsupervisory workers in the following industries: transportation and public utilities; wholesale and retail trade; finance, insurance, and real estate; and

services. These groups account for about four-fifths of the total employment on private nonagricutural payrolls.

Earnings are the payments production or nonsupervisory workers receive during the survey period, including premium pay for overtime or late-shift work but excluding irregular bonuses and other special payments. **Real earnings** are earnings adjusted to reflect the effects of changes in consumer prices. The deflator for this series is derived from the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). The **Hourly Earnings Index** is calculated from average hourly earnings data adjusted to exclude the effects of two types of changes that are unrelated to underlying wage-rate developments: fluctuations in overtime premiums in manufacturing (the only sector for which overtime data are available) and the effects of changes and seasonal factors in the proportion of workers in high-wage and low-wage industries.

Hours represent the average weekly hours of production or nonsupervisory workers for which pay was received and are different from standard or scheduled hours. **Overtime hours** represent the portion of average weekly hours which was in excess of regular hours and for which overtime premiums were paid.

The Diffusion Index, introduced in the May 1983 *Review*, represents the percent of 185 nonagricultural industries in which employment was rising over the indicated period. One-half of the industries with unchanged employment are counted as rising. In line with Bureau practice, data for the 1-, 3-, and 6-month spans are seasonally adjusted, while those for the 12-month span are unadjusted. The diffusion index is useful for measuring the dispersion of economic gains or losses and is also an economic indicator.

Notes on the data

Establishment data collected by the Bureau of Labor Statistics are periodically adjusted to comprehensive counts of employment (called "benchmarks"). The latest complete adjustment was made with the release of May 1987 data, published in the July 1987 issue of the *Review*. Consequently, data published in the *Review* prior to that issue are not necessarily comparable to current data. Unadjusted data have been revised back to April 1985; seasonally adjusted data have been revised back to January 1982. These revisions were published in the *Supplement to Employment and Earnings* (Bureau of Labor Statistics, 1987). Unadjusted data from April 1986 forward, and seasonally adjusted data from January 1983 forward are subject to revision in future benchmarks.

In the establishment survey, estimates for the 2 most recent months are based on incomplete returns and are published as preliminary in the tables (13 to 18 in the *Review*). When all returns have been received, the estimates are revised and published as final in the third month of their appearance. Thus, August data are published as preliminary in October and November and as final in December. For the same reason, quarterly establishment data (table 1) are preliminary for the first 2 months of publication and final in the third month. Thus, second-quarter data are published as preliminary in August and September and as final in October.

Additional sources of information

Detailed national data from the establishment survey are published monthly in the BLS periodical, *Employment and Earnings*. Earlier comparable unadjusted and seasonally adjusted data are published in *Employment, Hours, and Earnings, United States, 1909–84*, Bulletin 1312–12 (Bureau of Labor Statistics, 1985) and its annual supplement. For a detailed discussion of the methodology of the survey, see *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 2. For additional data, see *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985).

A comprehensive discussion of the differences between household and establishment data on employment appears in Gloria P. Green, "Comparing employment estimates from household and payroll surveys," *Monthly Labor Review*, December 1969, pp. 9–20.

Unemployment data by State

Description of the series

Data presented in this section are obtained from two major sources—the Current Population Survey (CPS) and the Local Area Unemployment Statistics (LAUS) program, which is conducted in cooperation with State employment security agencies.

Monthly estimates of the labor force, employment, and unemployment for States and sub-State areas are a key indicator of local economic conditions and form the basis for determining the eligibility of an area for benefits under Federal economic assistance programs such as the Job Training Partnership Act and the Public Works and Economic Development Act. Insofar as possible, the concepts and definitions underlying these data are those used in the national estimates obtained from the CPS.

Notes on the data

Data refer to State of residence. Monthly data for 11 States—California, Florida, Illinois, Massachusetts, Michigan, New York, New Jersey, North Carolina, Ohio, Pennsylvania, and Texas—are obtained directly from the CPS, because the size of the sample is large enough to meet BLS standards of reliability. Data for the remaining 39 States and the District of Columbia are derived using standardized procedures established by BLS. Once a year, estimates for the 11 States are revised to new population controls. For the remaining States and the District of Columbia, data are benchmarked to annual average CPS levels.

Additional sources of information

Information on the concepts, definitions, and technical procedures used to develop labor force data for States and sub-State areas as well as additional data on sub-States are provided in the monthly Bureau of Labor Statistics periodical, *Employment and Earnings*, and the annual report, *Geographic Profile of Employment and Unemployment* (Bureau of Labor Statistics). See also *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 4.

COMPENSATION AND WAGE DATA

(Tables 1–3; 22–29)

COMPENSATION AND WAGE DATA are gathered by the Bureau from business establishments, State and local governments, labor unions, collective bargaining agreements on file with the Bureau, and secondary sources.

Employment Cost Index

Description of the series

The **Employment Cost Index** (ECI) is a quarterly measure of the rate of change in compensation per hour worked and includes wages, salaries, and employer costs of employee benefits. It uses a fixed market basket of labor—similar in concept to the Consumer Price Index's fixed market basket of goods and services—to measure change over time in employer costs of employing labor. The index is not seasonally adjusted.

Statistical series on total compensation costs and on wages and salaries are available for private nonfarm workers excluding proprietors, the self-employed, and household workers. Both series are also available for State and local government workers and for the civilian nonfarm economy, which consists of private industry and State and local government workers combined. Federal workers are excluded.

The Employment Cost Index probability sample consists of about 2,200 private nonfarm establishments providing about 12,000 occupational observations and 700 State and local government establishments providing

3,500 occupational observations selected to represent total employment in each sector. On average, each reporting unit provides wage and compensation information on five well-specified occupations. Data are collected each quarter for the pay period including the 12th day of March, June, September, and December.

Beginning with June 1986 data, fixed employment weights from the 1980 Census of Population are used each quarter to calculate the indexes for civilian, private, and State and local governments. (Prior to June 1986, the employment weights are from the 1970 Census of Population.) These fixed weights, also used to derive all of the industry and occupation series indexes, ensure that changes in these indexes reflect only changes in compensation, not employment shifts among industries or occupations with different levels of wages and compensation. For the bargaining status, region, and metropolitan/nonmetropolitan area series, however, employment data by industry and occupation are not available from the census. Instead, the 1980 employment weights are reallocated within these series each quarter based on the current sample. Therefore, these indexes are not strictly comparable to those for the aggregate, industry, and occupation series.

Definitions

Total compensation costs include wages, salaries, and the employer's costs for employee benefits.

Wages and salaries consist of earnings before payroll deductions, including production bonuses, incentive earnings, commissions, and cost-of-living adjustments.

Benefits include the cost to employers for paid leave, supplemental pay (including nonproduction bonuses), insurance, retirement and savings plans, and legally required benefits (such as Social Security, workers' compensation, and unemployment insurance).

Excluded from wages and salaries and employee benefits are such items as payment-in-kind, free room and board, and tips.

Notes on the data

The Employment Cost Index data series began in the fourth quarter of 1975, with the quarterly percent change in wages and salaries in the private nonfarm sector. Data on employer costs for employee benefits were included in 1980 to produce, when combined with the wages and salaries series, a measure of the percent change in employer costs for employee total compensation. State and local government units were added to the ECI coverage in 1981, providing a measure of total compensation change in the *civilian* nonfarm economy (excluding Federal employees). Historical indexes (June 1981=100) of the quarterly rates of change are presented in the May issue of the BLS monthly periodical, *Current Wage Developments*.

Additional sources of information

For a more detailed discussion of the Employment Cost Index, see the *Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 11, and the following *Monthly Labor Review* articles: "Employment Cost Index: a measure of change in the 'price of labor'," July 1975; "How benefits will be incorporated into the Employment Cost Index," January 1978; "Estimation procedures for the Employment Cost Index," May 1982; and "Introducing new weights for the Employment Cost Index," June 1985.

Data on the ECI are also available in BLS quarterly press releases issued in the month following the reference months of March, June, September, and December; and from the *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985).

Collective bargaining settlements

Description of the series

Collective bargaining settlements data provide statistical measures of negotiated adjustments (increases, decreases, and freezes) in compensation (wage and benefit costs) and wages alone, quarterly for private industry and semiannually for State and local government. Compensation measures cover all collective bargaining situations involving 5,000 workers or more and wage measures cover all situations involving 1,000 workers or more. These data, covering private nonagricultural industries and State and local governments, are calculated using information obtained from bargaining agreements on file with the Bureau, parties to the agreements, and secondary sources, such as newspaper accounts. The data are not seasonally adjusted.

Settlement data are measured in terms of future specified adjustments: those that will occur within 12 months after contract ratification—first-year—and all adjustments that will occur over the life of the contract expressed as an average annual rate. Adjustments are worker weighted. Both first-year and over-the-life measures exclude wage changes that may occur under cost-of-living clauses that are triggered by future movements in the Consumer Price Index.

Effective wage adjustments measure all adjustments occurring in the reference period, regardless of the settlement date. Included are changes from settlements reached during the period, changes deferred from contracts negotiated in earlier periods, and changes under cost-of-living adjustment clauses. Each wage change is worker weighted. The changes are prorated over all workers under agreements during the reference period yielding the average adjustment.

Definitions

Wage rate changes are calculated by dividing newly negotiated wages by the average hourly earnings, excluding overtime, at the time the agreement is reached. Compensation changes are calculated by dividing the change in the value of the newly negotiated wage and benefit package by existing average hourly compensation, which includes the cost of previously negotiated benefits, legally required social insurance programs, and average hourly earnings.

Compensation changes are calculated by placing a value on the benefit portion of the settlements at the time they are reached. The cost estimates are based on the assumption that conditions existing at the time of settlement (for example, methods of financing pensions or composition of labor force) will remain constant. The data, therefore, are measures of negotiated changes and not of total changes in employer cost.

Contract duration runs from the effective date of the agreement to the expiration date or first wage reopening date, if applicable. Average annual percent changes over the contract term take account of the compounding of successive changes.

Notes on the data

Care should be exercised in comparing the size and nature of the settlements in State and local government with those in the private sector because of differences in bargaining practices and settlement characteristics. A principal difference is the incidence of cost-of-living adjustment (COLA) clauses which cover only about 2 percent of workers under a few local government settlements, but cover 50 percent of workers under private sector settlements. Agreements without COLA's tend to provide larger specified wage increases than those with COLA's. Another difference is that State and local government bargaining frequently excludes pension benefits which are often prescribed by law. In the private sector, in contrast, pensions are typically a bargaining issue.

Additional sources of information

For a more detailed discussion on the series, see the *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 10. Comprehensive data are published in press releases issued quarterly (in January, April, July, and October) for private industry, and semi-

annually (in February and August) for State and local government. Historical data and additional detailed tabulations for the prior calendar year appear in the April issue of the BLS monthly periodical, *Current Wage Developments*.

Work stoppages

Description of the series

Data on **work stoppages** measure the number and duration of major strikes or lockouts (involving 1,000 workers or more) occurring during the month (or year), the number of workers involved, and the amount of time lost because of stoppage.

Data are largely from newspaper accounts and cover only establishments directly involved in a stoppage. They do not measure the indirect or secondary effect of stoppages on other establishments whose employees are idle owing to material shortages or lack of service.

Definitions

Number of stoppages: The number of strikes and lockouts involving 1,000 workers or more and lasting a full shift or longer.

Workers involved: The number of workers directly involved in the stoppage.

Number of days idle: The aggregate number of workdays lost by workers involved in the stoppages.

Days of idleness as a percent of estimated working time: Aggregate workdays lost as a percent of the aggregate number of standard workdays in the period multiplied by total employment in the period.

Notes on the data

This series is not comparable with the one terminated in 1981 that covered strikes involving six workers or more.

Additional sources of information

Data for each calendar year are reported in a BLS press release issued in the first quarter of the following year. Monthly data appear in the BLS monthly periodical, *Current Wage Developments*. Historical data appear in the *BLS Handbook of Labor Statistics*.

Other compensation data

Other BLS data on pay and benefits, not included in the Current Labor Statistics section of the *Monthly Labor Review*, appear in and consist of the following:

Industry Wage Surveys provide data for specific occupations selected to represent an industry's wage structure and the types of activities performed by its workers. The Bureau collects information on weekly work schedules, shift operations and pay differentials, paid holiday and vacation practices, and information on incidence of health, insurance, and retirement plans. Reports are issued throughout the year as the surveys are completed. Summaries of the data and special analyses also appear in the *Monthly Labor Review*.

Area Wage Surveys annually provide data for selected office, clerical, professional, technical, maintenance, toolroom, powerplant, material movement, and custodial occupations common to a wide variety of industries in the areas (labor markets) surveyed. Reports are issued throughout the year as the surveys are completed. Summaries of the data and special analyses also appear in the *Review*.

The National Survey of Professional, Administrative, Technical, and Clerical Pay provides detailed information annually on salary levels and distributions for the types of jobs mentioned in the survey's title in private employment. Although the definitions of the jobs surveyed reflect the duties and responsibilities in private industry, they are designed to match specific pay grades of Federal white-collar employees under the General Schedule pay system. Accordingly, this survey provides the legally required information for comparing the pay of salaried employees in the Federal civil service with pay in private industry. (See Federal Pay Comparability Act of 1970, 5 U.S.C. 5305.) Data are published in a BLS news release issued in the summer and in a bulletin each fall; summaries and analytical articles also appear in the *Review*.

Employee Benefits Survey provides nationwide information on the incidence and characteristics of employee benefit plans in medium and large establishments in the United States, excluding Alaska and Hawaii. Data are published in an annual BLS news release and bulletin, as well as in special articles appearing in the *Review*.

PRICE DATA
(Tables 2; 30–41)

PRICE DATA are gathered by the Bureau of Labor Statistics from retail and primary markets in the United States. Price indexes are given in relation to a base period (1982 = 100 or 1982–84 = 100), unless otherwise noted).

Consumer Price Indexes

Description of the series

The **Consumer Price Index** (CPI) is a measure of the average change in the prices paid by urban consumers for a fixed market basket of goods and services. The CPI is calculated monthly for two population groups, one consisting only of urban households whose primary source of income is derived from the employment of wage earners and clerical workers, and the other consisting of all urban households. The wage earner index (CPI–W) is a continuation of the historic index that was introduced well over a half-century ago for use in wage negotiations. As new uses were developed for the CPI in recent years, the need for a broader and more representative index became apparent. The all urban consumer index (CPI–U), introduced in 1978, is representative of the 1982–84 buying habits of about 80 percent of the noninstitutional population of the United States at that time, compared with 32 percent represented in the CPI–W. In addition to wage earners and clerical workers, the CPI–U covers professional, managerial, and technical workers, the self-employed, short-term workers, the unemployed, retirees, and others not in the labor force.

The CPI is based on prices of food, clothing, shelter, fuel, drugs, transportation fares, doctors' and dentists' fees, and other goods and services that people buy for day-to-day living. The quantity and quality of these items are kept essentially unchanged between major revisions so that only price changes will be measured. All taxes directly associated with the purchase and use of items are included in the index.

Data collected from more than 21,000 retail establishments and 60,000 housing units in 91 urban areas across the country are used to develop the "U.S. city average." Separate estimates for 27 major urban centers are presented in table 31. The areas listed are as indicated in footnote 1 to the table. The area indexes measure only the average change in prices for each area since the base period, and do not indicate differences in the level of prices among cities.

Notes on the data

In January 1983, the Bureau changed the way in which homeownership costs are measured for the CPI–U. A rental equivalence method replaced the

asset-price approach to homeownership costs for that series. In January 1985, the same change was made in the CPI-W. The central purpose of the change was to separate shelter costs from the investment component of homeownership so that the index would reflect only the cost of shelter services provided by owner-occupied homes. An updated CPI-U and CPI-W were introduced with release of the January 1987 data.

Additional sources of information

For a discussion of the general method for computing the CPI, see *BLS Handbook of Methods, Volume II, The Consumer Price Index*, Bulletin 2134–2 (Bureau of Labor Statistics, 1984). The recent change in the measurement of homeownership costs is discussed in Robert Gillingham and Walter Lane, "Changing the treatment of shelter costs for homeowners in the CPI," *Monthly Labor Review*, July 1982, pp. 9–14. An overview of the recently introduced revised CPI, reflecting 1982–84 expenditure patterns, is contained in *The Consumer Price Index: 1987 Revision*, Report 736 (Bureau of Labor Statistics, 1987).

Additional detailed CPI data and regular analyses of consumer price changes are provided in the *CPI Detailed Report*, a monthly publication of the Bureau. Historical data for the overall CPI and for selected groupings may be found in the *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985).

Producer Price Indexes

Description of the series

Producer Price Indexes (PPI) measure average changes in prices received in primary markets of the United States by producers of commodities in all stages of processing. The sample used for calculating these indexes currently contains about 3,100 commodities and about 75,000 quotations per month selected to represent the movement of prices of all commodities produced in the manufacturing, agriculture, forestry, fishing, mining, gas and electricity, and public utilities sectors. The stage of processing structure of Producer Price Indexes organizes products by class of buyer and degree of fabrication (that is, finished goods, intermediate goods, and crude materials). The traditional commodity structure of PPI organizes products by similarity of end use or material composition.

To the extent possible, prices used in calculating Producer Price Indexes apply to the first significant commercial transaction in the United States from the production or central marketing point. Price data are generally collected monthly, primarily by mail questionnaire. Most prices are obtained directly from producing companies on a voluntary and confidential basis. Prices generally are reported for the Tuesday of the week containing the 13th day of the month.

Since January 1987, price changes for the various commodities have been averaged together with implicit quantity weights representing their importance in the total net selling value of all commodities as of 1982. The detailed data are aggregated to obtain indexes for stage-of-processing groupings, commodity groupings, durability-of-product groupings, and a number of special composite groups. All Producer Price Index data are subject to revision 4 months after original publication.

Notes on the data

Beginning with the January 1986 issue, the *Review* is no longer presenting tables of Producer Price Indexes for commodity groupings, special composite groups, or SIC industries. However, these data will continue to be presented in the Bureau's monthly publication *Producer Price Indexes*.

The Bureau has completed the first major stage of its comprehensive overhaul of the theory, methods, and procedures used to construct the Producer Price Indexes. Changes include the replacement of judgment sampling with probability sampling techniques; expansion to systematic coverage of the net output of virtually all industries in the mining and manufacturing sectors; a shift from a commodity to an industry orientation; the exclusion of imports from, and the inclusion of exports in, the survey universe; and the respecification of commodities priced to conform to Bureau of the Census definitions. These and other changes have been phased in gradually since 1978. The result is a system of indexes that is easier to use in conjunction with data on wages, productivity, and employment and other series that are organized in terms of the Standard Industrial Classification and the Census product class designations.

Additional sources of information

For a discussion of the methodology for computing Producer Price Indexes, see *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 7.

Additional detailed data and analyses of price changes are provided monthly in *Producer Price Indexes*. Selected historical data may be found in the *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985).

International Price Indexes

Description of the series

The BLS **International Price Program** produces quarterly export and import price indexes for nonmilitary goods traded between the United States and the rest of the world. The export price index provides a measure of price change for all products sold by U.S. residents to foreign buyers. ("Residents" is defined as in the national income accounts: it includes corporations, businesses, and individuals but does not require the organizations to be U.S. owned nor the individuals to have U.S. citizenship.) The import price index provides a measure of price change for goods purchased from other countries by U.S. residents. With publication of an all-import index in February 1983 and an all-export index in February 1984, all U.S. merchandise imports and exports now are represented in these indexes. The reference period for the indexes is 1977 = 100, unless otherwise indicated.

The product universe for both the import and export indexes includes raw materials, agricultural products, semifinished manufactures, and finished manufactures, including both capital and consumer goods. Price data for these items are collected quarterly by mail questionnaire. In nearly all cases, the data are collected directly from the exporter or importer, although in a few cases, prices are obtained from other sources.

To the extent possible, the data gathered refer to prices at the U.S. border for exports and at either the foreign border or the U.S. border for imports. For nearly all products, the prices refer to transactions completed during the first 2 weeks of the third month of each calendar quarter—March, June, September, and December. Survey respondents are asked to indicate all discounts, allowances, and rebates applicable to the reported prices, so that the price used in the calculation of the indexes is the actual price for which the product was bought or sold.

In addition to general indexes of prices for U.S. exports and imports, indexes are also published for detailed product categories of exports and imports. These categories are defined by the 4- and 5-digit level of detail of the Standard Industrial Trade Classification System (SITC). The calculation of indexes by SITC category facilitates the comparison of U.S. price trends and sector production with similar data for other countries. Detailed indexes are also computed and published on a Standard Industrial Classification (SIC-based) basis, as well as by end-use class.

Notes on the data

The export and import price indexes are weighted indexes of the Laspeyres type. Price relatives are assigned equal importance within each weight category and are then aggregated to the SITC level. The values assigned to each weight category are based on trade value figures compiled

by the Bureau of the Census. The trade weights currently used to compute both indexes relate to 1980.

Because a price index depends on the same items being priced from period to period, it is necessary to recognize when a product's specifications or terms of transaction have been modified. For this reason, the Bureau's quarterly questionnaire requests detailed descriptions of the physical and functional characteristics of the products being priced, as well as information on the number of units bought or sold, discounts, credit terms, packaging, class of buyer or seller, and so forth. When there are changes in either the specifications or terms of transaction of a product, the dollar value of each change is deleted from the total price change to obtain the "pure" change. Once this value is determined, a linking procedure is employed which allows for the continued repricing of the item.

For the export price indexes, the preferred pricing basis is f.a.s. (free alongside ship) U.S. port of exportation. When firms report export prices f.o.b. (free on board), production point information is collected which enables the Bureau to calculate a shipment cost to the port of exportation. An attempt is made to collect two prices for imports. The first is the import price f.o.b. at the foreign port of exportation, which is consistent with the basis for valuation of imports in the national accounts. The second is the import price c.i.f. (cost, insurance, and freight) at the U.S. port of importation, which also includes the other costs associated with bringing the product to the U.S. border. It does not, however, include duty charges.

Additional sources of information

For a discussion of the general method of computing International Price Indexes, see *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 8.

Additional detailed data and analyses of international price developments are presented in the Bureau's quarterly publication *U.S. Import and Export Price Indexes* and in occasional *Monthly Labor Review* articles prepared by BLS analysts. Selected historical data may be found in the *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985).

PRODUCTIVITY DATA
(Tables 2; 42–47)

U. S. productivity and related data

Description of the series

The productivity measures relate real physical output to real input. As such, they encompass a family of measures which include single factor input measures, such as output per unit of labor input (output per hour) or output per unit of capital input, as well as measures of multifactor productivity (output per unit of labor and capital inputs combined). The Bureau indexes show the change in output relative to changes in the various inputs. The measures cover the business, nonfarm business, manufacturing, and nonfinancial corporate sectors.

Corresponding indexes of hourly compensation, unit labor costs, unit nonlabor payments, and prices are also provided.

Definitions

Output per hour of all persons (labor productivity) is the value of goods and services in constant prices produced per hour of labor input. **Output per unit of capital services** (capital productivity) is the value of goods and services in constant dollars produced per unit of capital services input.

Multifactor productivity is the ratio output per unit of labor and capital inputs combined. Changes in this measure reflect changes in a number of factors which affect the production process such as changes in technology, shifts in the composition of the labor force, changes in capacity utilization, research and development, skill and efforts of the work force, management, and so forth. Changes in the output per hour measures reflect the impact of these factors as well as the substitution of capital for labor.

Compensation per hour is the wages and salaries of employees plus employers' contributions for social insurance and private benefit plans, and the wages, salaries, and supplementary payments for the self-employed (except for nonfinancial corporations in which there are no self-employed)—the sum divided by hours paid for. **Real compensation per hour** is compensation per hour deflated by the change in the Consumer Price Index for All Urban Consumers.

Unit labor costs are the labor compensation costs expended in the production of a unit of output and are derived by dividing compensation by output. **Unit nonlabor payments** include profits, depreciation, interest, and indirect taxes per unit of output. They are computed by subtracting compensation of all persons from current dollar value of output and dividing by output. **Unit nonlabor costs** contain all the components of unit nonlabor payments *except* unit profits.

Unit profits include corporate profits and the value of inventory adjustments per unit of output.

Hours of all persons are the total hours paid of payroll workers, self-employed persons, and unpaid family workers.

Capital services is the flow of services from the capital stock used in production. It is developed from measures of the net stock of physical assets—equipment, structures, land, and inventories—weighted by rental prices for each type of asset.

Labor and capital inputs combined are derived by combining changes in labor and capital inputs with weights which represent each component's share of total output. The indexes for capital services and combined units of labor and capital are based on changing weights which are averages of the shares in the current and preceding year (the Tornquist index-number formula).

Notes on the data

Output measures for the business sector and the nonfarm businesss sector exclude the constant dollar value of owner-occupied housing, rest of world, households and institutions, and general government output from the constant dollar value of gross national product. The measures are derived from data supplied by the Bureau of Economic Analysis, U.S. Department of Commerce, and the Federal Reserve Board. Quarterly manufacturing output indexes are adjusted by the Bureau of Labor Statistics to annual estimates of output (gross product originating) from the Bureau of Economic Analysis. Compensation and hours data are developed from data of the Bureau of Labor Statistics and the Bureau of Economic Analysis.

The productivity and associated cost measures in tables 42–44 describe the relationship between output in real terms and the labor time and capital services involved in its production. They show the changes from period to period in the amount of goods and services produced per unit of input. Although these measures relate output to hours and capital services, they do not measure the contributions of labor, capital, or any other specific factor of production. Rather, they reflect the joint effect of many influences, including changes in technology; capital investment; level of output; utilization of capacity, energy, and materials; the organization of production; managerial skill; and the characteristics and efforts of the work force.

Additional sources of information

Descriptions of methodology underlying the measurement of output per hour and multifactor productivity are found in the *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 13. Historical data for selected industries are provided in the Bureau's *Handbook of Labor Statistics*, 1985, Bulletin 2217.

INTERNATIONAL COMPARISONS (Tables 45–47)

Labor force and unemployment

Description of the series

Tables 45 and 46 present comparative measures of the labor force, employment, and unemployment—approximating U.S. concepts—for the United States, Canada, Australia, Japan, and six European countries. The unemployment statistics (and, to a lesser extent, employment statistics) published by other industrial countries are not, in most cases, comparable to U.S. unemployment statistics. Therefore, the Bureau adjusts the figures for selected countries, where necessary, for all known major definitional differences. Although precise comparability may not be achieved, these adjusted figures provide a better basis for international comparisons than the figures regularly published by each country.

Definitions

For the principal U.S. definitions of the **labor force**, **employment**, and **unemployment**, see the Notes section on EMPLOYMENT DATA: Household Survey Data.

Notes on the data

The adjusted statistics have been adapted to the age at which compulsory schooling ends in each country, rather than to the U.S. standard of 16 years of age and over. Therefore, the adjusted statistics relate to the population age 16 and over in France, Sweden, and from 1973 onward, the United Kingdom; 16 and over in Canada, Australia, Japan, Germany, the Netherlands, and prior to 1973, the United Kingdom; and 14 and over in Italy. The institutional population is included in the denominator of the labor force participation rates and employment-population ratios for Japan and Germany; it is excluded for the United States and the other countries.

In the U.S. labor force survey, persons on layoff who are awaiting recall to their job are classified as unemployed. European and Japanese layoff practices are quite different in nature from those in the United States; therefore, strict application of the U.S. definition has not been made on this point. For further information, see *Monthly Labor Review*, December 1981, pp. 8–11.

The figures for one or more recent years for France, Germany, Italy, the Netherlands, and the United Kingdom are calculated using adjustment factors based on labor force surveys for earlier years and are considered preliminary. The recent-year measures for these countries are, therefore, subject to revision whenever data from more current labor force surveys become available.

Additional sources of information

For further information, see *International Comparisons of Unemployment*, Bulletin 1979 (Bureau of Labor Statistics, 1978), Appendix B and unpublished Supplements to Appendix B available on request. The statistics are also analyzed periodically in the *Monthly Labor Review*. Additional historical data, generally beginning with 1959, are published in the *Handbook of Labor Statistics* and are available in unpublished statistical supplements to Bulletin 1979.

Manufacturing productivity and labor costs

Description of the series

Table 47 presents comparative measures of manufacturing labor productivity, hourly compensation costs, and unit labor costs for the United States, Canada, Japan, and nine European countries. These measures are limited to trend comparisons—that is, intercountry series of changes over time—rather than level comparisons because reliable international comparisons of the levels of manufacturing output are unavailable.

Definitions

Output is constant value output (value added), generally taken from the national accounts of each country. While the national accounting methods for measuring real output differ considerably among the 12 countries, the use of different procedures does not, in itself, connote lack of comparability—rather, it reflects differences among countries in the availability and reliability of underlying data series.

Hours refer to all employed persons including the self-employed in the United States and Canada; to all wage and salary employees in the other countries. The U.S. hours measure is hours paid; the hours measures for the other countries are hours worked.

Compensation (labor cost) includes all payments in cash or kind made directly to employees plus employer expenditures for legally required insurance programs and contractual and private benefit plans. In addition, for some countries, compensation is adjusted for other significant taxes on payrolls or employment (or reduced to reflect subsidies), even if they are not for the direct benefit of workers, because such taxes are regarded as labor costs. However, compensation does not include all items of labor cost. The costs of recruitment, employee training, and plant facilities and services—such as cafeterias and medical clinics—are not covered because data are not available for most countries. Self-employed workers are included in the U.S. and Canadian compensation figures by assuming that their hourly compensation is equal to the average for wage and salary employees.

Notes on the data

For most of the countries, the measures refer to total manufacturing as defined by the International Standard Industrial Classification. However, the measures for France (beginning 1959), Italy (beginning 1970), and the United Kingdom (beginning 1971), refer to manufacturing and mining less energy-related products and the figures for the Netherlands exclude petroleum refining from 1969 to 1976. For all countries, manufacturing includes the activities of government enterprises.

The figures for one or more recent years are generally based on current indicators of manufacturing output, employment, hours, and hourly compensation and are considered preliminary until the national accounts and other statistics used for the long-term measures become available.

Additional sources of information

For additional information, see the *BLS Handbook of Methods*, Bulletin 2134-1 (Bureau of Labor Statistics, 1982), chapter 16 and periodic *Monthly Labor Review* articles. Historical data are provided in the Bureau's *Handbook of Labor Statistics*, Bulletin 2217, 1985. The statistics are issued twice per year—in a news release (generally in May) and in a *Monthly Labor Review* article (generally in December).

OCCUPATIONAL INJURY AND ILLNESS DATA

(Table 48)

Description of the series

The Annual Survey of Occupational Injuries and Illnesses is designed to collect data on injuries and illnesses based on records which employers in the following industries maintain under the Occupational Safety and Health Act of 1970: agriculture, forestry, and fishing; oil and gas extraction; construction; manufacturing; transportation and public utilities; wholesale and retail trade; finance, insurance, and real estate; and services. Excluded from the survey are self-employed individuals, farmers with fewer than 11 employees, employers regulated by other Federal safety and health laws, and Federal, State, and local government agencies.

Because the survey is a Federal–State cooperative program and the data must meet the needs of participating State agencies, an independent sample is selected for each State. The sample is selected to represent all private industries in the States and territories. The sample size for the survey is dependent upon (1) the characteristics for which estimates are needed; (2) the industries for which estimates are desired; (3) the characteristics of the population being sampled; (4) the target reliability of the estimates; and (5) the survey design employed.

While there are many characteristics upon which the sample design could be based, the total recorded case incidence rate is used because it is one of the most important characteristics and the least variable; therefore, it requires the smallest sample size.

The survey is based on stratified random sampling with a Neyman allocation and a ratio estimator. The characteristics used to stratify the establishments are the Standard Industrial Classification (SIC) code and size of employment.

Definitions

Recordable occupational injuries and illnesses are: (1) occupational deaths, regardless of the time between injury and death, or the length of the illness; or (2) nonfatal occupational illnesses; or (3) nonfatal occupational injuries which involve one or more of the following: loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment (other than first aid).

Occupational injury is any injury such as a cut, fracture, sprain, amputation, and so forth, which results from a work accident or from exposure involving a single incident in the work environment.

Occupational illness is an abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or disease which may be caused by inhalation, absorption, ingestion, or direct contact.

Lost workday cases are cases which involve days away from work, or days of restricted work activity, or both.

Lost workday cases involving restricted work activity are those cases which result in restricted work activity only.

Lost workdays away from work are the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury or illness.

Lost workdays—restricted work activity are the number of workdays (consecutive or not) on which, because of injury or illness: (1) the employee was assigned to another job on a temporary basis; or (2) the employee worked at a permanent job less than full time; or (3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it.

The number of days away from work or days of restricted work activity does not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.

Incidence rates represent the number of injuries and/or illnesses or lost workdays per 100 full-time workers.

Notes on the data

Estimates are made for industries and employment-size classes and for severity classification: fatalities, lost workday cases, and nonfatal cases without lost workdays. Lost workday cases are separated into those where the employee would have worked but could not and those in which work activity was restricted. Estimates of the number of cases and the number of days lost are made for both categories.

Most of the estimates are in the form of incidence rates, defined as the number of injuries and illnesses, or lost workdays, per 100 full-time employees. For this purpose, 200,000 employee hours represent 100 employee years (2,000 hours per employee). Only a few of the available measures are included in the *Handbook of Labor Statistics*. Full detail is presented in the annual bulletin, *Occupational Injuries and Illnesses in the United States, by Industry*.

Comparable data for individual States are available from the BLS Office of Occupational Safety and Health Statistics.

Mining and railroad data are furnished to BLS by the Mine Safety and Health Administration and the Federal Railroad Administration, respectively. Data from these organizations are included in BLS and State publications. Federal employee experience is compiled and published by the Occupational Safety and Health Administration. Data on State and local government employees are collected by about half of the States and territories; these data are not compiled nationally.

Additional sources of information

The Supplementary Data System provides detailed information describing various factors associated with work-related injuries and illnesses. These data are obtained from information reported by *employers* to State workers' compensation agencies. The Work Injury Report program examines selected types of accidents through an employee survey which focuses on the circumstances surrounding the injury. These data are not included in the *Handbook of Labor Statistics* but are available from the BLS Office of Occupational Safety and Health Statistics.

The definitions of occupational injuries and illnesses and lost workdays are from *Recordkeeping Requirements under the Occupational Safety and Health Act of 1970*. For additional data, see *Occupational Injuries and Illnesses in the United States, by Industry*, annual Bureau of Labor Statistics bulletin; BLS *Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, 1982), chapter 17; *Handbook of Labor Statistics*, Bulletin 2217 (Bureau of Labor Statistics, 1985), pp. 411–14; annual reports in the *Monthly Labor Review*; and annual U.S. Department of Labor press releases.

1. Labor market indicators

Selected indicators	1986	1987	1986				1987			
			I	II	III	IV	I	II	III	IV
Employment data										
Employment status of the civilian noninstitutionalized population (household survey)[1]										
Labor force participation rate	65.3	65.6	65.0	65.2	65.4	65.4	65.5	65.5	65.6	65.7
Employment-population ratio	60.7	61.5	60.5	60.6	60.8	60.9	61.1	61.4	61.7	61.9
Unemployment rate	7.0	6.2	7.0	7.2	7.0	6.8	6.6	6.3	6.0	5.9
Men	6.9	6.2	6.8	7.0	7.0	6.9	6.6	6.3	5.9	5.8
16 to 24 years	13.7	12.6	13.4	14.1	13.9	13.4	13.3	12.9	12.2	11.9
25 years and over	5.4	4.8	5.3	5.4	5.4	5.4	5.1	4.9	4.6	4.4
Women	7.1	6.2	7.2	7.3	7.0	6.8	6.6	6.2	6.1	6.0
16 to 24 years	12.8	11.7	13.1	13.1	12.7	12.5	12.5	11.8	11.4	11.1
25 years and over	5.5	4.8	5.6	5.7	5.4	5.3	5.0	4.7	4.7	4.7
Unemployment rate, 15 weeks and over	1.9	1.7	1.9	1.9	1.9	1.9	1.8	1.7	1.6	1.5
Employment, nonagricultural (payroll data), in thousands:[1]										
Total	99,610	102,112	98,901	99,321	99,804	100,397	101,133	101,708	102,278	103,293
Private sector	82,900	85,049	82,299	82,670	83,119	83,498	84,183	84,675	85,240	86,069
Goods-producing	24,681	24,884	24,767	24,702	24,629	24,624	24,733	24,757	24,884	25,164
Manufacturing	18,994	19,112	19,086	19,003	18,939	18,953	18,979	19,015	19,134	19,322
Service-producing	74,930	77,228	74,134	74,619	75,175	75,773	76,399	76,951	77,394	78,129
Average hours:										
Private sector	34.8	34.8	34.9	34.8	34.7	34.7	34.8	34.8	34.8	34.8
Manufacturing	40.7	41.0	40.7	40.7	40.7	40.8	41.0	40.9	40.9	41.2
Overtime	3.4	3.7	3.4	3.4	3.5	3.5	3.6	3.7	3.7	3.9
Employment Cost Index										
Percent change in the ECI, compensation:										
All workers (excluding farm, household, and Federal workers)	3.6	3.6	1.1	.7	1.1	.6	.9	.7	1.2	.8
Private industry workers	3.2	3.3	1.1	.8	.7	.6	1.0	.7	1.0	.7
Goods-producing[2]	3.1	3.1	1.1	.9	.6	.5	.5	.7	.8	1.0
Service-producing[2]	3.2	3.7	1.1	.6	.8	.6	1.3	.7	1.0	.5
State and local government workers	5.2	4.4	1.0	.6	2.8	.8	.8	.3	2.3	.9
Workers by bargaining status (private industry):										
Union	2.1	2.8	1.0	.2	.5	.3	.5	.5	.6	1.1
Nonunion	3.6	3.6	1.2	.9	.8	.7	1.1	.7	1.1	.6

[1] Quarterly data seasonally adjusted.

[2] Goods-producing industries include mining, construction, and manufacturing. Service-producing industries include all other private sector industries.

2. Annual and quarterly percent changes in compensation, prices, and productivity

Selected measures	1986	1987	1986				1987			
			I	II	III	IV	I	II	III	IV
Compensation data [1, 2]										
Employment Cost Index--compensation (wages, salaries, benefits):										
Civilian nonfarm	3.6	3.6	1.1	0.7	1.1	0.6	0.9	0.7	1.2	0.8
Private nonfarm	3.2	3.3	1.1	.8	.7	.6	1.0	.7	1.0	.7
Employment Cost Index--wages and salaries										
Civilian nonfarm	3.5	3.5	1.0	.8	1.1	.6	1.0	.5	1.3	.7
Private nonfarm	3.1	3.3	1.0	.9	.7	.5	1.0	.7	1.0	.6
Price data[1]										
Consumer Price Index (All urban consumers): All items	1.1	4.4	–.5	.6	.6	.3	1.4	1.2	1.3	.3
Producer Price Index:										
Finished goods	–2.3	2.1	–3.1	.5	–.7	1.1	.8	1.2	.2	.0
Finished consumer goods	–3.5	2.5	–4.0	.4	–.7	.8	.9	1.6	.3	–.3
Capital equipment	2.1	1.3	.2	.6	–.8	2.1	.1	.3	–.2	1.1
Intermediate materials, supplies, components	–4.4	5.5	–3.0	–.9	–.2	–.3	1.3	1.9	1.2	1.0
Crude materials	–8.9	8.8	–7.6	–1.5	–.6	.6	4.2	5.3	.6	–1.5
Productivity data[3]										
Output per hour of all persons:										
Business sector	1.9	.9	2.8	2.3	1.3	1.5	.2	.4	1.6	1.4
Nonfarm business sector	1.6	.8	2.3	1.9	1.1	1.5	–.1	.3	1.5	1.4
Nonfinancial corporations [4]	1.6	–	2.6	1.8	.7	1.5	0	.2	.8	–

[1] Annual changes are December-to-December change. Quarterly changes are calculated using the last month of each quarter. Compensation and price data are not seasonally adjusted and the price data are not compounded.
[2] Excludes Federal and private household workers.
[3] Annual rates of change are computed by comparing annual averages. Quarterly percent changes reflect annual rates of change in quarterly indexes. The data are seasonally adjusted.
[4] Output per hour of all employees.
– Data not available.

3. Alternative measures of wage and compensation changes

Components	Quarterly average						Four quarters ended--					
	1986		1987				1986		1987			
	III	IV	I	II	III	IV	III	IV	I	II	III	IV
Average hourly compensation:[1]												
All persons, business sector	3.7	3.3	2.8	2.8	3.0	2.9	3.0	3.6	1.4	3.3	3.8	3.1
All employees, nonfarm business sector	3.6	3.4	2.7	2.7	2.9	2.8	2.8	4.0	1.1	3.0	3.6	3.4
Employment Cost Index--compensation:												
Civilian nonfarm [2]	1.1	.6	.9	.7	1.2	.8	3.6	3.6	3.4	3.3	3.4	3.6
Private nonfarm	.7	.6	1.0	.7	1.0	.7	3.2	3.2	3.1	3.0	3.3	3.3
Union	.5	.3	.5	.5	.6	1.1	2.3	2.1	1.6	1.9	2.0	2.8
Nonunion	.8	.7	1.1	.7	1.1	.6	3.5	3.6	3.6	3.4	3.7	3.6
State and local governments	2.8	.8	.8	.3	2.3	.9	5.2	5.2	5.0	4.7	4.2	4.4
Employment Cost Index--wages and salaries:												
Civilian nonfarm[2]	1.1	.6	1.0	.5	1.3	.7	3.5	3.5	3.5	3.2	3.4	3.5
Private nonfarm	.7	.5	1.0	.7	1.0	.6	3.1	3.1	3.2	3.0	3.3	3.3
Union	.6	.2	.4	.5	.6	1.1	2.3	2.0	1.7	1.7	1.7	2.6
Nonunion	.7	.7	1.2	.8	1.1	.5	3.4	3.5	3.5	3.3	3.8	3.6
State and local governments	3.2	.7	.8	.2	2.3	.9	5.4	5.4	5.2	5.0	4.1	4.2
Total effective wage adjustments[3]	.5	.5	.4	1.0	.9	.8	2.3	2.3	2.0	2.2	2.6	3.1
From current settlements	.1	.2	([4])	.2	.2	.3	.5	.5	.4	.3	.5	.7
From prior settlements	.5	.2	.3	.7	.6	.3	1.6	1.7	1.5	1.6	1.7	1.8
From cost-of-living provision	([4])	.1	.1	.2	.1	.2	.2	.2	.1	.3	.4	.5
Negotiated wage adjustments from settlements:[3]												
First-year adjustments	.8	2.0	1.2	2.6	2.1	2.4	1.2	1.2	1.2	1.5	2.1	2.2
Annual rate over life of contract	1.5	2.1	1.8	2.9	2.0	1.8	1.7	1.8	1.8	2.0	2.2	2.1
Negotiated wage and benefit adjustments from settlements:[5]												
First-year adjustment	.7	2.7	1.7	4.1	2.5	3.4	.9	1.1	1.2	1.9	2.8	3.1
Annual rate over life of contract	1.2	2.4	2.4	3.9	2.1	2.4	1.4	1.6	1.7	2.1	2.6	2.6

[1] Seasonally adjusted.
[2] Excludes Federal and household workers.
[3] Limited to major collective bargaining units of 1,000 workers or more. The most recent data are preliminary.
[4] Data round to zero.
[5] Limited to major collective bargaining units of 5,000 workers or more. The most recent data are preliminary.

4. Employment status of the total population, by sex, monthly data seasonally adjusted

(Numbers in thousands)

Employment status	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
TOTAL															
Noninstitutional population [1, 2]	182,293	184,490	183,738	183,915	184,079	184,259	184,421	184,605	184,738	184,904	185,052	185,225	185,370	185,571	185,705
Labor force[2]	119,540	121,602	120,970	120,982	121,098	121,633	121,326	121,610	122,042	121,706	122,128	122,349	122,472	122,924	123,084
Participation rate [3]	65.6	65.9	65.8	65.8	65.8	66.0	65.8	65.9	66.1	65.8	66.0	66.1	66.1	66.2	66.3
Total employed [2]	111,303	114,177	113,084	113,191	113,541	114,060	114,018	114,359	114,786	114,615	114,951	115,259	115,494	115,878	116,145
Employment-population ratio [4]	61.1	61.9	61.5	61.5	61.7	61.9	61.8	61.9	62.1	62.0	62.1	62.2	62.3	62.4	62.5
Resident Armed Forces [1]	1,706	1,737	1,740	1,736	1,735	1,726	1,718	1,720	1,736	1,743	1,741	1,755	1,750	1,749	1,736
Civilian employed	109,597	112,440	111,344	111,455	111,806	112,334	112,300	112,639	113,050	112,872	113,210	113,504	113,744	114,129	114,409
Agriculture	3,163	3,208	3,225	3,237	3,250	3,269	3,192	3,212	3,143	3,184	3,249	3,172	3,215	3,293	3,228
Nonagricultural industries	106,434	109,232	108,119	108,218	108,556	109,065	109,108	109,427	109,907	109,688	109,961	110,332	110,529	110,836	111,182
Unemployed	8,237	7,425	7,886	7,791	7,557	7,573	7,308	7,251	7,256	7,091	7,177	7,090	6,978	7,046	6,938
Unemployment rate [5]	6.9	6.1	6.5	6.4	6.2	6.2	6.0	6.0	5.9	5.8	5.9	5.8	5.7	5.7	5.6
Not in labor force	62,752	62,888	62,768	62,933	62,981	62,626	63,095	62,995	62,696	63,198	62,924	62,876	62,898	62,647	62,621
Men, 16 years and over															
Noninstitutional population [1, 2]	87,349	88,476	88,099	88,186	88,271	88,361	88,442	88,534	88,598	88,683	88,756	88,849	88,924	89,033	89,099
Labor force[2]	66,973	67,784	67,655	67,590	67,604	67,802	67,623	67,671	67,937	67,776	67,947	68,019	68,030	68,243	68,343
Participation rate [3]	76.7	76.6	76.8	76.6	76.6	76.7	76.5	76.4	76.7	76.4	76.6	76.6	76.5	76.6	76.7
Total employed [2]	62,443	63,684	63,281	63,263	63,390	63,543	63,543	63,711	63,916	63,949	64,048	64,174	64,245	64,396	64,636
Employment-population ratio [4]	71.5	72.0	71.8	71.7	71.8	71.9	71.8	72.0	72.1	72.1	72.2	72.2	72.2	72.3	72.5
Resident Armed Forces [1]	1,551	1,577	1,584	1,575	1,575	1,566	1,559	1,561	1,575	1,581	1,580	1,593	1,589	1,588	1,577
Civilian employed	60,892	62,107	61,697	61,688	61,815	61,977	61,984	62,150	62,341	62,368	62,468	62,581	62,656	62,808	63,059
Unemployed	4,530	4,101	4,374	4,327	4,214	4,259	4,080	3,960	4,021	3,827	3,899	3,845	3,785	3,847	3,707
Unemployment rate [5]	6.8	6.1	6.5	6.4	6.2	6.3	6.0	5.9	5.9	5.6	5.7	5.7	5.6	5.6	5.4
Women, 16 years and over															
Noninstitutional population [1, 2]	94,944	96,013	95,639	95,729	95,808	95,898	95,979	96,071	96,140	96,221	96,295	96,376	96,446	96,538	96,606
Labor force[2]	52,568	53,818	53,315	53,392	53,494	53,831	53,703	53,939	54,105	53,930	54,181	54,330	54,442	54,681	54,740
Participation rate [3]	55.4	56.1	55.7	55.8	55.8	56.1	56.0	56.1	56.3	56.0	56.3	56.4	56.4	56.6	56.7
Total employed[2]	48,861	50,494	49,803	49,928	50,151	50,517	50,475	50,648	50,870	50,666	50,903	51,085	51,249	51,482	51,509
Employment-population ratio [4]	51.5	52.6	52.1	52.2	52.3	52.7	52.6	52.7	52.9	52.7	52.9	53.0	53.1	53.3	53.3
Resident Armed Forces [1]	155	160	156	161	160	160	159	159	161	162	161	162	161	161	159
Civilian employed	48,706	50,334	49,647	49,767	49,991	50,357	50,316	50,489	50,709	50,504	50,742	50,923	51,088	51,321	51,350
Unemployed	3,707	3,324	3,512	3,464	3,343	3,314	3,228	3,291	3,235	3,264	3,278	3,245	3,193	3,200	3,231
Unemployment rate [5]	7.1	6.2	6.6	6.5	6.2	6.2	6.0	6.1	6.0	6.1	6.1	6.0	5.9	5.9	5.9

[1] The population and Armed Forces figures are not adjusted for seasonal variation.
[2] Includes members of the Armed Forces stationed in the United States.
[3] Labor force as a percent of the noninstitutional population.
[4] Total employed as a percent of the noninstitutional population.
[5] Unemployment as a percent of the labor force (including the resident Armed Forces).

5. Employment status of the civilian population, by sex, age, race and Hispanic origin, monthly data seasonally adjusted

(Numbers in thousands)

Employment status	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
TOTAL															
Civilian noninstitutional population[1]	180,587	182,753	181,998	182,179	182,344	182,533	182,703	182,885	183,002	183,161	183,311	183,470	183,620	183,822	183,969
Civilian labor force	117,834	119,865	119,230	119,246	119,363	119,907	119,608	119,890	120,306	119,963	120,387	120,594	120,722	121,175	121,348
Participation rate	65.3	65.6	65.5	65.5	65.5	65.7	65.5	65.6	65.7	65.5	65.7	65.7	65.7	65.9	66.0
Employed	109,597	112,440	111,344	111,455	111,806	112,334	112,300	112,639	113,050	112,872	113,210	113,504	113,744	114,129	114,409
Employment-population ratio[2]	60.7	61.5	61.2	61.2	61.3	61.5	61.5	61.6	61.8	61.6	61.8	61.9	61.9	62.1	62.2
Unemployed	8,237	7,425	7,886	7,791	7,557	7,573	7,308	7,251	7,256	7,091	7,177	7,090	6,978	7,046	6,938
Unemployment rate	7.0	6.2	6.6	6.5	6.3	6.3	6.1	6.0	6.0	5.9	6.0	5.9	5.8	5.8	5.7
Not in labor force	62,752	62,888	62,768	62,933	62,981	62,626	63,095	62,995	62,696	63,198	62,924	62,876	62,898	62,647	62,621
Men, 20 years and over															
Civilian noninstitutional population[1]	78,523	79,565	79,216	79,303	79,387	79,474	79,536	79,625	79,668	79,740	79,807	79,885	80,002	80,120	80,203
Civilian labor force	61,320	62,095	61,930	61,933	61,970	62,129	62,054	62,106	62,083	62,085	62,211	62,299	62,248	62,440	62,696
Participation rate	78.1	78.0	78.2	78.1	78.1	78.2	78.0	78.0	77.9	77.9	78.0	78.0	77.8	77.9	78.2
Employed	57,569	58,726	58,324	58,380	58,516	58,673	58,632	58,783	58,825	58,967	59,037	59,164	59,185	59,287	59,625
Employment-population ratio[2]	73.3	73.8	73.6	73.6	73.7	73.8	73.7	73.8	73.8	73.9	74.0	74.1	74.0	74.0	74.3
Agriculture	2,292	2,329	2,317	2,361	2,378	2,383	2,316	2,333	2,289	2,345	2,343	2,297	2,298	2,323	2,280
Nonagricultural industries	55,277	56,397	56,007	56,019	56,138	56,290	56,316	56,450	56,536	56,622	56,694	56,867	56,887	56,964	57,344
Unemployed	3,751	3,369	3,606	3,553	3,454	3,456	3,422	3,323	3,258	3,118	3,174	3,135	3,063	3,154	3,071
Unemployment rate	6.1	5.4	5.8	5.7	5.6	5.6	5.5	5.4	5.2	5.0	5.1	5.0	4.9	5.1	4.9
Women, 20 years ond over															
Civilian noninstitutional population[1]	87,567	88,583	88,237	88,321	88,395	88,464	88,546	88,632	88,685	88,785	88,843	88,923	89,010	89,110	89,178
Civilian labor force	48,589	49,783	49,343	49,414	49,494	49,728	49,722	49,886	49,969	49,922	50,095	50,254	50,361	50,558	50,640
Participation rate	55.5	56.2	55.9	55.9	56.0	56.2	56.2	56.3	56.3	56.2	56.4	56.5	56.6	56.7	56.8
Employed	45,556	47,074	46,485	46,582	46,761	47,028	47,088	47,206	47,308	47,251	47,480	47,634	47,750	47,977	48,005
Employment-population ratio[2]	52.0	53.1	52.7	52.7	52.9	53.2	53.2	53.3	53.3	53.2	53.4	53.6	53.6	53.8	53.8
Agriculture	614	622	634	602	603	629	619	620	609	600	636	636	643	646	654
Nonagricultural industries	44,943	46,453	45,851	45,980	46,158	46,399	46,469	46,586	46,699	46,651	46,844	46,998	47,107	47,331	47,351
Unemployed	3,032	2,709	2,858	2,832	2,733	2,700	2,634	2,680	2,661	2,671	2,615	2,620	2,611	2,581	2,635
Unemployment rate	6.2	5.4	5.8	5.7	5.5	5.4	5.3	5.4	5.3	5.4	5.2	5.2	5.2	5.1	5.2
Both sexes, 16 to 19 years															
Civilian noninstitutional population[1]	14,496	14,606	14,546	14,555	14,562	14,595	14,621	14,628	14,649	14,637	14,661	14,663	14,609	14,592	14,588
Civilian labor force	7,926	7,988	7,957	7,899	7,899	8,050	7,832	7,898	8,254	7,956	8,081	8,041	8,113	8,177	8,011
Participation rate	54.7	54.7	54.7	54.3	54.2	55.2	53.6	54.0	56.3	54.4	55.1	54.8	55.5	56.0	54.9
Employed	6,472	6,640	6,535	6,493	6,529	6,633	6,580	6,650	6,917	6,654	6,693	6,706	6,809	6,865	6,779
Employment-population ratio[2]	44.6	45.5	44.9	44.6	44.8	45.4	45.0	45.5	47.2	45.5	45.7	45.7	46.6	47.0	46.5
Agriculture	258	258	274	274	269	257	257	259	245	239	270	239	274	323	293
Nonagricultural industries	6,215	6,382	6,261	6,219	6,260	6,376	6,323	6,391	6,672	6,415	6,423	6,467	6,535	6,542	6,486
Unemployed	1,454	1,347	1,422	1,406	1,370	1,417	1,252	1,248	1,337	1,302	1,388	1,335	1,304	1,312	1,232
Unemployment rate	18.3	16.9	17.9	17.8	17.3	17.6	16.0	15.8	16.2	16.4	17.2	16.6	16.1	16.0	15.4
White															
Civilian noninstitutional population[1]	155,432	156,958	156,431	156,561	156,676	156,811	156,930	157,058	157,134	157,242	157,342	157,449	157,552	157,676	157,773
Civilian labor force	101,801	103,290	102,825	102,836	102,972	103,416	103,150	103,248	103,516	103,357	103,669	103,731	103,907	104,252	104,530
Participation rate	65.5	65.8	65.7	65.7	65.7	65.9	65.7	65.7	65.9	65.7	65.9	65.9	66.0	66.1	66.3
Employed	95,660	97,789	97,001	97,074	97,338	97,829	97,698	97,917	98,181	98,069	98,317	98,492	98,779	99,044	99,474
Employment-population ratio[2]	61.5	62.3	62.0	62.0	62.1	62.4	62.3	62.3	62.5	62.4	62.5	62.6	62.7	62.8	63.0
Unemployed	6,140	5,501	5,824	5,762	5,634	5,587	5,452	5,331	5,335	5,288	5,352	5,239	5,128	5,208	5,056
Unemployment rate	6.0	5.3	5.7	5.6	5.5	5.4	5.3	5.2	5.2	5.1	5.2	5.1	4.9	5.0	4.8
Black															
Civilian noninstitutional population[1]	19,989	20,352	20,218	20,249	20,279	20,312	20,341	20,373	20,396	20,426	20,453	20,482	20,508	20,539	20,569
Civilian labor force	12,654	12,993	12,894	12,853	12,778	12,889	12,892	13,039	13,150	13,028	13,152	13,193	13,215	13,222	13,168
Participation rate	63.3	63.8	63.8	63.5	63.0	63.5	63.4	64.0	64.5	63.8	64.3	64.4	64.4	64.4	64.0
Employed	10,814	11,309	11,086	11,072	11,114	11,129	11,238	11,381	11,513	11,421	11,556	11,589	11,605	11,608	11,504
Employment-population ratio[2]	54.1	55.6	54.8	54.7	54.8	54.8	55.2	55.9	56.4	55.9	56.5	56.6	56.6	56.5	55.9
Unemployed	1,840	1,684	1,808	1,781	1,664	1,760	1,654	1,658	1,637	1,607	1,596	1,604	1,610	1,614	1,663
Unemployment rate	14.5	13.0	14.0	13.9	13.0	13.7	12.8	12.7	12.4	12.3	12.1	12.2	12.2	12.2	12.6

See footnotes at end of table.

5. Continued— Employment status of the civilian population, by sex, age, race and Hispanic origin, monthly data seasonally adjusted

(Numbers in thousands)

Employment status	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Hispanic origin															
Civilian noninstitutional population[1]	12,344	12,867	12,692	12,732	12,770	12,809	12,848	12,887	12,925	12,965	13,003	13,043	13,082	13,115	13,153
Civilian labor force	8,076	8,541	8,423	8,395	8,468	8,549	8,468	8,447	8,549	8,581	8,654	8,763	8,772	8,879	9,017
Participation rate	65.4	66.4	66.4	65.9	66.3	66.7	65.9	65.5	66.1	66.2	66.6	67.2	67.1	67.7	68.6
Employed	7,219	7,790	7,614	7,632	7,686	7,797	7,738	7,762	7,856	7,877	7,935	7,978	8,056	8,238	8,268
Employment-population ratio[2]	58.5	60.5	60.0	59.9	60.2	60.9	60.2	60.2	60.8	60.8	61.0	61.2	61.6	62.8	62.9
Unemployed	857	751	809	763	782	752	730	685	693	704	719	785	714	642	749
Unemployment rate	10.6	8.8	9.6	9.1	9.2	8.8	8.6	8.1	8.1	8.2	8.3	9.0	8.1	7.2	8.3

[1] The population figures are not seasonally adjusted.
[2] Civilian employment as a percent of the civilian noninstitutional population.
NOTE: Detail for the above race and Hispanic-origin groups will not sum to totals because data for the "other races" groups are not presented and Hispanics are included in both the white and black population groups.

6. Selected employment indicators, monthly data seasonally adjusted

(In thousands)

Selected categories	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
CHARACTERISTIC															
Civilian employed, 16 years and over	109,597	112,440	111,344	111,455	111,806	112,334	112,300	112,639	113,050	112,872	113,210	113,504	113,744	114,129	114,409
Men	60,892	62,107	61,697	61,688	61,815	61,977	61,984	62,150	62,341	62,368	62,468	62,581	62,656	62,808	63,059
Women	48,706	50,334	49,647	49,767	49,991	50,357	50,316	50,489	50,709	50,504	50,742	50,923	51,088	51,321	51,350
Married men, spouse present	39,658	40,265	39,958	40,054	40,021	40,075	40,120	40,262	40,308	40,404	40,556	40,645	40,711	40,404	40,475
Married women, spouse present	27,144	28,107	27,837	27,966	28,130	28,314	28,282	28,283	28,189	28,069	28,099	28,175	28,249	28,441	28,707
Women who maintain families	5,837	6,060	5,925	5,946	5,971	5,963	6,011	6,033	6,107	6,151	6,178	6,237	6,227	6,168	6,157
MAJOR INDUSTRY AND CLASS OF WORKER															
Agriculture:															
Wage and salary workers	1,547	1,632	1,640	1,689	1,599	1,672	1,622	1,625	1,591	1,624	1,705	1,595	1,599	1,666	1,677
Self-employed workers	1,447	1,423	1,440	1,416	1,488	1,429	1,403	1,424	1,393	1,415	1,430	1,407	1,450	1,454	1,414
Unpaid family workers	169	153	132	152	170	165	162	153	155	139	140	155	156	138	114
Nonagricultural industries:															
Wage and salary workers	98,299	100,771	99,772	99,863	100,106	100,634	100,510	100,825	101,241	101,282	101,522	101,943	101,997	102,507	102,683
Government	16,342	16,800	16,553	16,594	16,518	16,708	16,920	16,876	16,794	16,928	17,033	17,118	17,064	17,197	16,948
Private industries	81,957	83,970	83,219	83,269	83,588	83,926	83,590	83,949	84,447	84,354	84,489	84,825	84,933	85,310	85,735
Private households	1,235	1,208	1,213	1,227	1,234	1,240	1,163	1,212	1,175	1,100	1,222	1,286	1,200	1,147	1,170
Other	80,722	82,762	82,006	82,042	82,354	82,686	82,427	82,737	83,272	83,254	83,267	83,539	83,733	84,163	84,565
Self-employed workers	7,881	8,201	8,166	8,082	8,139	8,157	8,293	8,216	8,214	8,204	8,274	8,222	8,280	8,150	8,312
Unpaid family workers	255	260	254	270	268	276	274	266	248	297	242	235	248	237	228
PERSONS AT WORK PART TIME[1]															
All industries:															
Part time for economic reasons	5,588	5,401	5,766	5,459	5,394	5,333	5,254	5,428	5,283	5,261	5,353	5,534	5,262	5,367	5,566
Slack work	2,456	2,385	2,501	2,438	2,345	2,292	2,345	2,429	2,468	2,213	2,377	2,408	2,284	2,396	2,478
Could only find part-time work	2,800	2,672	2,773	2,707	2,725	2,677	2,623	2,683	2,526	2,683	2,655	2,696	2,638	2,640	2,598
Voluntary part time	13,935	14,395	14,110	14,201	13,940	14,498	14,836	14,437	14,573	14,415	14,488	14,523	14,711	14,571	14,572
Nonagricultural industries:															
Part time for economic reasons	5,345	5,122	5,458	5,180	5,104	5,058	4,979	5,154	5,016	4,986	5,067	5,241	5,004	5,145	5,254
Slack work	2,305	2,201	2,315	2,234	2,163	2,126	2,176	2,261	2,265	2,034	2,196	2,209	2,111	2,260	2,327
Could only find part-time work	2,719	2,587	2,682	2,612	2,648	2,603	2,530	2,599	2,463	2,603	2,557	2,597	2,552	2,566	2,457
Voluntary part time	13,502	13,928	13,635	13,717	13,544	13,995	14,334	13,953	14,099	13,987	14,011	14,064	14,222	14,096	14,123

[1] Excludes persons "with a job but not at work" during the survey period for such reasons as vacation, illness, or industrial disputes.

7. Selected unemployment indicators, monthly data seasonally adjusted

(Unemployment rates)

Selected categories	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
CHARACTERISTIC															
Total, all civilian workers	7.0	6.2	6.6	6.5	6.3	6.3	6.1	6.0	6.0	5.9	6.0	5.9	5.8	5.8	5.7
Both sexes, 16 to 19 years	18.3	16.9	17.9	17.8	17.3	17.6	16.0	15.8	16.2	16.4	17.2	16.6	16.1	16.0	15.4
Men, 20 years and over	6.1	5.4	5.8	5.7	5.6	5.6	5.5	5.4	5.2	5.0	5.1	5.0	4.9	5.1	4.9
Women, 20 years and over	6.2	5.4	5.8	5.7	5.5	5.4	5.3	5.4	5.3	5.4	5.2	5.2	5.2	5.1	5.2
White, total	6.0	5.3	5.7	5.6	5.5	5.4	5.3	5.2	5.2	5.1	5.2	5.1	4.9	5.0	4.8
Both sexes, 16 to 19 years	15.6	14.4	15.1	15.3	14.8	15.2	13.9	13.3	14.1	14.3	14.5	14.1	13.6	14.0	12.4
Men, 16 to 19 years	16.3	15.5	16.0	16.8	16.3	17.0	14.8	13.5	15.2	15.1	15.1	14.8	14.9	14.4	12.2
Women, 16 to 19 years	14.9	13.4	14.1	13.7	13.3	13.3	13.0	13.1	12.9	13.4	13.8	13.3	12.3	13.6	12.7
Men, 20 years and over	5.3	4.8	5.1	5.0	4.9	4.8	4.9	4.7	4.6	4.4	4.6	4.4	4.3	4.4	4.1
Women, 20 years and over	5.4	4.6	4.8	4.7	4.6	4.5	4.4	4.5	4.4	4.5	4.3	4.4	4.4	4.2	4.5
Black, total	14.5	13.0	14.0	13.9	13.0	13.7	12.8	12.7	12.4	12.3	12.1	12.2	12.2	12.2	12.6
Both sexes, 16 to 19 years	39.3	34.7	38.0	37.0	37.1	37.5	33.4	32.7	30.6	30.8	33.8	33.9	33.4	35.0	38.3
Men, 16 to 19 years	39.3	34.4	37.9	36.1	37.8	38.3	31.4	32.4	33.7	31.5	32.5	32.2	33.5	35.1	42.0
Women, 16 to 19 years	39.2	34.9	38.0	38.0	36.3	36.6	35.4	33.1	27.1	30.0	35.2	35.8	33.4	34.9	34.7
Men, 20 years and over	12.9	11.1	11.9	11.6	11.0	12.3	11.4	11.2	10.7	10.1	9.8	10.2	10.1	10.1	11.3
Women, 20 years and over	12.4	11.6	12.6	12.7	11.6	11.6	11.3	11.4	11.3	11.7	11.0	10.8	10.9	11.1	10.4
Hispanic origin, total	10.6	8.8	9.6	9.1	9.2	8.8	8.6	8.1	8.1	8.2	8.3	9.0	8.1	7.2	8.3
Married men, spouse present	4.4	3.9	4.1	4.1	4.1	4.0	4.0	3.8	3.7	3.7	3.7	3.5	3.4	3.6	3.4
Married women, spouse present	5.2	4.3	4.8	4.5	4.4	4.2	4.0	4.2	4.3	4.2	4.2	4.2	4.3	4.2	4.1
Women who maintain families	9.8	9.2	9.6	9.7	9.4	9.5	9.5	9.3	9.0	8.8	8.9	8.5	8.4	8.9	8.3
Full-time workers	6.6	5.8	6.2	6.1	5.9	5.9	5.9	5.7	5.6	5.5	5.6	5.5	5.4	5.4	5.3
Part-time workers	9.1	8.4	8.8	9.1	8.6	8.7	7.3	8.1	8.2	8.4	8.3	8.2	8.0	8.3	7.9
Unemployed 15 weeks and over	1.9	1.7	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4
Labor force time lost[1]	7.9	7.1	7.5	7.4	7.3	7.2	7.1	6.9	6.9	6.8	6.8	6.8	6.6	6.6	6.6
INDUSTRY															
Nonagricultural private wage and salary workers	7.0	6.2	6.6	6.5	6.3	6.3	6.1	6.1	6.0	5.9	5.9	5.8	5.7	5.8	5.7
Mining	13.5	10.0	13.0	9.5	11.2	13.0	9.5	7.9	8.6	7.4	8.3	7.0	8.0	7.7	7.8
Construction	13.1	11.6	11.7	12.4	12.0	12.1	11.7	10.8	11.3	11.9	11.2	10.6	10.6	12.2	11.0
Manufacturing	7.1	6.0	6.8	6.7	6.3	6.3	5.7	6.0	5.6	5.6	5.7	5.3	5.1	5.6	5.6
Durable goods	6.9	5.8	6.7	6.6	6.2	6.2	5.4	6.0	5.5	5.4	5.2	4.8	4.8	5.5	5.9
Nondurable goods	7.4	6.3	6.9	7.0	6.4	6.5	6.1	5.9	5.8	5.9	6.5	5.9	5.6	5.8	5.3
Transportation and public utilities	5.1	4.5	4.1	4.5	4.7	4.4	4.8	4.4	4.4	4.1	4.4	4.5	4.6	3.6	3.6
Wholesale and retail trade	7.6	6.9	7.2	7.3	7.1	7.0	7.1	6.8	7.0	6.4	6.5	6.8	6.2	6.1	6.4
Finance and service industries	5.5	4.9	5.2	4.9	4.8	4.9	4.9	5.1	4.7	4.8	4.7	4.8	4.8	4.9	4.5
Government workers	3.6	3.5	3.6	3.5	3.5	3.4	3.4	3.4	3.7	3.4	3.3	3.4	3.2	3.0	2.8
Agricultural wage and salary workers	12.5	10.5	11.0	10.8	9.5	9.4	9.3	10.9	10.6	8.6	10.6	11.1	10.9	11.5	10.2

[1] Aggregate hours lost by the unemployed and persons on part time for economic reasons as a percent of potentially available labor force hours.

8. Unemployment rates by sex and age, monthly data seasonally adjusted

(Civilian workers)

Sex and age	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Total, 16 years and over	7.0	6.2	6.6	6.5	6.3	6.3	6.1	6.0	6.0	5.9	6.0	5.9	5.8	5.8	5.7
16 to 24 years	13.3	12.2	13.0	12.8	12.6	12.5	12.1	11.8	11.8	11.8	11.8	11.6	11.2	11.6	11.1
16 to 19 years	18.3	16.9	17.9	17.8	17.3	17.6	16.0	15.8	16.2	16.4	17.2	16.6	16.1	16.0	15.4
16 to 17 years	20.2	19.1	19.8	19.9	18.9	21.0	18.8	17.5	18.3	18.3	20.4	19.2	17.8	18.7	17.4
18 to 19 years	17.0	15.2	16.4	16.2	15.9	15.2	14.5	13.9	14.7	15.2	14.7	14.8	14.7	14.5	13.9
20 to 24 years	10.7	9.7	10.4	10.2	10.1	9.8	10.0	9.7	9.4	9.4	8.8	8.9	8.5	9.1	8.7
25 years and over	5.4	4.8	5.1	5.0	4.8	4.8	4.7	4.7	4.7	4.6	4.6	4.5	4.5	4.5	4.5
25 to 54 years	5.7	5.0	5.5	5.3	5.1	5.1	4.9	5.0	4.9	4.8	4.8	4.7	4.8	4.7	4.7
55 years and over	3.9	3.3	3.1	3.4	3.4	3.6	3.2	3.1	3.2	3.3	3.1	3.4	3.2	3.5	3.3
Men, 16 years and over	6.9	6.2	6.6	6.6	6.4	6.4	6.2	6.0	6.1	5.8	5.9	5.8	5.7	5.8	5.6
16 to 24 years	13.7	12.6	13.5	13.2	13.1	13.2	12.4	11.9	12.5	12.1	12.1	12.0	11.7	12.2	11.3
16 to 19 years	19.0	17.8	18.5	19.0	18.7	19.6	16.4	15.9	17.8	17.3	17.4	17.2	17.2	16.4	15.6
16 to 17 years	20.8	20.2	20.5	20.3	21.0	22.7	19.1	17.1	20.5	19.7	20.9	20.4	19.3	19.4	16.9
18 to 19 years	17.7	16.0	17.1	17.9	17.1	17.2	15.4	13.7	15.9	15.9	14.8	14.8	15.3	14.9	14.7
20 to 24 years	11.0	9.9	10.9	10.2	10.3	9.9	10.4	9.9	9.6	9.3	9.2	9.2	8.7	9.9	9.0
25 years and over	5.4	4.8	5.1	5.1	4.9	4.9	4.8	4.7	4.7	4.5	4.5	4.4	4.4	4.4	4.3
25 to 54 years	5.6	5.0	5.4	5.3	5.1	5.1	5.0	4.9	4.9	4.7	4.8	4.6	4.6	4.5	4.5
55 years and over	4.1	3.5	3.4	3.6	3.7	3.9	3.4	3.4	3.4	3.2	3.1	3.5	3.2	4.0	3.4
Women, 16 years and over	7.1	6.2	6.6	6.5	6.3	6.2	6.0	6.1	6.0	6.1	6.1	6.0	5.9	5.9	5.9
16 to 24 years	12.8	11.7	12.4	12.4	12.0	11.8	11.7	11.7	11.0	11.5	11.5	11.2	10.7	10.9	10.8
16 to 19 years	17.6	15.9	17.1	16.6	15.9	15.6	15.5	15.7	14.4	15.4	16.9	16.0	14.8	15.6	15.1
16 to 17 years	19.6	18.0	19.0	19.6	16.6	19.1	18.4	18.0	16.0	16.9	19.9	17.9	16.2	17.9	18.0
18 to 19 years	16.3	14.3	15.7	14.3	14.7	13.1	13.6	14.1	13.4	14.4	14.6	14.7	14.1	14.1	13.1
20 to 24 years	10.3	9.4	9.9	10.1	10.0	9.7	9.6	9.5	9.0	9.4	8.5	8.6	8.4	8.2	8.4
25 years and over	5.5	4.8	5.1	5.0	4.8	4.7	4.5	4.7	4.7	4.7	4.7	4.7	4.7	4.6	4.7
25 to 54 years	5.9	5.1	5.5	5.3	5.1	5.0	4.9	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9
55 years and over	3.6	3.0	2.7	3.0	2.9	3.0	2.8	2.6	2.9	3.5	3.1	3.2	3.3	2.8	3.1

9. Unemployed persons by reason for unemployment, monthly data seasonally adjusted

(Numbers in thousands)

Reason for unemployment	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Job losers	4,033	3,566	3,835	3,791	3,705	3,612	3,554	3,529	3,389	3,313	3,388	3,307	3,200	3,209	3,207
On layoff	1,090	943	1,001	1,003	963	924	919	916	874	820	944	878	856	888	884
Other job losers	2,943	2,623	2,834	2,788	2,742	2,688	2,635	2,613	2,515	2,493	2,444	2,429	2,344	2,320	2,323
Job leavers	1,015	965	1,033	996	955	931	959	989	992	981	960	926	946	1,082	961
Reentrants	2,160	1,974	2,038	2,078	1,965	1,995	1,980	1,930	1,969	1,908	1,845	1,974	1,945	1,917	1,951
New entrants	1,029	920	1,007	952	918	999	854	844	855	882	914	855	909	885	864
PERCENT OF UNEMPLOYED															
Job losers	48.9	48.0	48.5	48.5	49.1	47.9	48.4	48.4	47.0	46.8	47.7	46.8	45.7	45.2	45.9
On layoff	13.2	12.7	12.7	12.8	12.8	12.3	12.5	12.6	12.1	11.6	13.3	12.4	12.2	12.5	12.7
Other job losers	35.7	35.3	35.8	35.7	36.4	35.7	35.9	35.8	34.9	35.2	34.4	34.4	33.5	32.7	33.3
Job leavers	12.3	13.0	13.1	12.7	12.7	12.4	13.1	13.6	13.8	13.8	13.5	13.1	13.5	15.3	13.8
Reentrants	26.2	26.6	25.8	26.6	26.1	26.5	26.9	26.5	27.3	26.9	26.0	28.0	27.8	27.0	27.9
New entrants	12.5	12.4	12.7	12.2	12.2	13.3	11.6	11.6	11.9	12.5	12.9	12.1	13.0	12.5	12.4
PERCENT OF CIVILIAN LABOR FORCE															
Job losers	3.4	3.0	3.2	3.2	3.1	3.0	3.0	2.9	2.8	2.8	2.8	2.7	2.7	2.6	2.6
Job leavers	.9	.8	.9	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.9	.8
Reentrants	1.8	1.6	1.7	1.7	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6
New entrants	.9	.8	.8	.8	.8	.8	.7	.7	.7	.7	.8	.7	.8	.7	.7

10. Duration of unemployment, monthly data seasonally adjusted

(Numbers in thousands)

Weeks of unemployment	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Less than 5 weeks	3,448	3,246	3,343	3,352	3,195	3,308	3,138	3,186	3,203	3,220	3,223	3,218	3,229	3,089	3,084
5 to 14 weeks	2,557	2,196	2,444	2,411	2,256	2,165	2,151	2,144	2,142	1,949	2,093	2,029	1,968	2,263	2,145
15 weeks and over	2,232	1,983	2,129	2,055	2,060	2,067	2,029	1,920	1,896	1,904	1,801	1,834	1,791	1,733	1,740
15 to 26 weeks	1,045	943	1,004	944	984	974	973	945	834	917	844	899	892	839	841
27 weeks and over	1,187	1,040	1,125	1,111	1,076	1,093	1,056	975	1,062	987	957	935	899	894	899
Mean duration in weeks	15.0	14.5	14.8	14.9	14.8	14.8	14.7	14.2	14.3	14.2	14.1	14.0	14.2	14.4	14.4
Median duration in weeks	6.9	6.5	6.7	6.7	6.9	6.6	6.6	6.6	6.4	5.8	6.2	6.1	6.0	6.4	6.4

11. Unemployment rates of civilian workers by State, data not seasonally adjusted

State	Jan. 1987	Jan. 1988	State	Jan. 1987	Jan. 1988
Alabama	10.1	7.9	Montana	10.1	9.5
Alaska	11.7	10.8	Nebraska	5.7	5.2
Arizona	7.9	5.6	Nevada	6.6	7.2
Arkansas	9.6	9.2	New Hampshire	2.9	3.3
California	6.9	5.6	New Jersey	4.6	4.5
Colorado	9.3	7.8	New Mexico	9.9	8.8
Connecticut	4.0	3.7	New York	6.2	5.0
Delaware	3.7	4.4	North Carolina	5.2	5.1
District of Columbia	8.0	6.1	North Dakota	6.9	7.0
Florida	5.8	5.0	Ohio	8.7	7.1
Georgia	5.9	6.4	Oklahoma	8.5	7.3
Hawaii	4.4	3.9	Oregon	8.4	7.1
Idaho	10.9	9.5	Pennsylvania	6.5	6.2
Illinois	8.2	7.4	Rhode Island	4.5	4.0
Indiana	7.5	6.5	South Carolina	6.1	6.1
Iowa	7.1	7.0	South Dakota	5.5	4.7
Kansas	6.4	5.6	Tennessee	8.2	6.9
Kentucky	10.8	9.5	Texas	9.8	8.4
Louisiana	14.9	12.0	Utah	7.4	6.7
Maine	6.8	5.5	Vermont	5.2	4.1
Maryland	5.4	5.2	Virginia	5.4	4.2
Massachusetts	4.1	3.8	Washington	9.3	8.2
Michigan	8.1	10.7	West Virginia	13.0	13.8
Minnesota	6.4	6.1	Wisconsin	8.0	7.0
Mississippi	12.7	10.6			
Missouri	6.9	6.7	Wyoming	10.6	8.9

NOTE: Some data in this table may differ from data published elsewhere because of the continual updating of the database.

12. Employment of workers on nonagricultural payrolls by State, data not seasonally adjusted

(In thousands)

State	Jan. 1987	Dec. 1987	Jan. 1988[p]	State	Jan. 1987	Dec. 1987	Jan. 1988[p]
Alabama	1,464.6	1,527.9	1,505.5	Nebraska	642.4	670.2	657.1
Alaska	196.6	203.1	196.0	Nevada	472.4	514.4	507.3
Arizona	1,353.4	1,423.1	1,404.1	New Hampshire	494.8	529.0	521.0
Arkansas	803.4	851.2	833.3				
California	11,355.0	11,973.2	11,806.5	New Jersey	3,485.2	3,653.2	3,572.2
				New Mexico	516.5	536.4	526.2
Colorado	1,393.6	1,415.6	1,395.5	New York	7,839.3	8,219.5	8,025.8
Connecticut	1,603.5	1,674.5	1,640.3	North Carolina	2,779.4	2,930.5	2,884.1
Delaware	305.9	330.9	319.9	North Dakota	243.6	254.4	248.7
District of Columbia	633.5	664.2	654.1				
Florida	4,728.2	5,037.3	5,022.8	Ohio	4,447.6	4,676.9	4,567.6
				Oklahoma	1,097.7	1,108.3	1,078.7
Georgia	2,696.3	2,807.8	2,766.3	Oregon	1,050.2	1,116.5	1,094.5
Hawaii	447.7	470.6	463.6	Pennsylvania	4,760.4	5,016.5	4,901.5
Idaho	318.2	340.0	331.3	Rhode Island	440.3	458.3	446.7
Illinois	4,803.2	4,963.8	4,900.5				
Indiana	2,211.6	2,360.1	2,315.8	South Carolina	1,345.1	1,422.1	1,396.4
				South Dakota	246.3	256.3	249.6
Iowa	1,056.9	1,133.4	1,109.6	Tennessee	1,937.5	2,056.7	2,025.4
Kansas	968.9	1,020.7	996.1	Texas	6,440.6	6,580.8	6,517.7
Kentucky	1,278.6	1,352.0	1,333.1	Utah	625.3	652.9	636.0
Louisiana	1,460.6	1,504.3	1,485.2				
Maine	474.3	517.9	503.6	Vermont	237.9	252.3	250.1
				Virginia	2,588.4	2,744.7	2,701.1
Maryland	1,951.9	2,050.8	2,017.2	Washington	1,766.8	1,880.4	1,845.3
Massachusetts	2,959.1	3,101.9	3,031.4	West Virginia	584.7	607.3	591.8
Michigan	3,654.0	3,776.3	3,682.7	Wisconsin	2,003.8	2,121.4	2,073.8
Minnesota	1,884.5	1,997.9	1,952.0				
Mississippi	842.3	884.7	875.5	Wyoming	176.3	177.2	173.0
Missouri	2,125.9	2,215.1	2,165.5	Puerto Rico	736.2	777.5	763.8
Montana	265.9	275.3	269.5	Virgin Islands	38.8	40.2	39.6

[p] = preliminary

NOTE: Some data in this table may differ from data published elsewhere because of the continual updating of the database.

13. Employment of workers on nonagricultural payrolls by industry, monthly data seasonally adjusted

(In thousands)

Industry	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.[p]	Feb.[p]
TOTAL	99,610	102,112	101,150	101,329	101,598	101,708	101,818	102,126	102,275	102,434	102,983	103,285	103,612	103,786	104,317
PRIVATE SECTOR	82,900	85,049	84,215	84,352	84,560	84,677	84,787	85,106	85,229	85,386	85,795	86,072	86,341	86,533	86,996
GOODS-PRODUCING	24,681	24,884	24,743	24,749	24,759	24,752	24,761	24,850	24,886	24,917	25,064	25,169	25,259	25,204	25,332
Mining	783	741	719	722	729	735	738	744	751	759	764	759	756	745	746
Oil and gas extraction	457	425	406	408	416	420	425	430	434	439	443	439	436	428	429
Construction	4,904	5,031	5,038	5,032	5,019	4,999	5,008	5,002	5,006	4,989	5,053	5,074	5,121	5,059	5,166
General building contractors	1,293	1,278	1,309	1,291	1,272	1,267	1,266	1,261	1,262	1,260	1,279	1,280	1,290	1,303	1,320
Manufacturing	18,994	19,112	18,986	18,995	19,011	19,018	19,015	19,104	19,129	19,169	19,247	19,336	19,382	19,400	19,420
Production workers	12,895	13,021	12,916	12,925	12,939	12,946	12,958	13,020	13,038	13,072	13,129	13,197	13,241	13,252	13,276
Durable goods	11,244	11,237	11,179	11,176	11,175	11,175	11,176	11,195	11,248	11,268	11,319	11,367	11,403	11,405	11,413
Production workers	7,432	7,457	7,398	7,399	7,406	7,409	7,421	7,425	7,475	7,494	7,530	7,568	7,597	7,590	7,606
Lumber and wood products	711	739	733	734	736	738	735	740	736	740	741	750	753	753	754
Furniture and fixtures	497	514	501	502	504	509	510	518	518	520	524	526	530	533	532
Stone, clay, and glass products	586	585	588	586	586	584	582	582	582	581	583	588	590	585	588
Primary metal industries	753	751	733	739	743	742	746	750	754	764	768	771	771	768	771
Blast furnaces and basic steel products	275	275	261	266	272	272	275	277	278	283	286	287	285	284	287
Fabricated metal products	1,431	1,428	1,419	1,419	1,423	1,420	1,424	1,424	1,425	1,429	1,438	1,446	1,451	1,453	1,454
Machinery, except electrical	2,060	2,039	2,018	2,015	2,022	2,025	2,028	2,033	2,044	2,053	2,064	2,074	2,085	2,096	2,097
Electrical and electronic equipment	2,123	2,101	2,106	2,099	2,092	2,087	2,080	2,088	2,095	2,096	2,111	2,118	2,128	2,130	2,128
Transportation equipment	2,015	2,015	2,022	2,022	2,011	2,011	2,010	1,995	2,028	2,018	2,019	2,016	2,018	2,006	2,005
Motor vehicles and equipment	865	842	859	854	847	843	842	814	848	837	838	835	832	822	822
Instruments and related products	707	696	695	694	694	693	693	695	695	695	697	701	701	703	703
Miscellaneous manufacturing industries	362	369	364	366	364	366	368	370	371	372	374	377	376	378	381
Nondurable goods	7,750	7,875	7,807	7,819	7,836	7,843	7,839	7,909	7,881	7,901	7,928	7,969	7,979	7,995	8,007
Production workers	5,463	5,564	5,518	5,526	5,533	5,537	5,537	5,595	5,563	5,578	5,599	5,629	5,644	5,662	5,670
Food and kindred products	1,617	1,636	1,630	1,635	1,642	1,633	1,634	1,644	1,632	1,631	1,635	1,645	1,645	1,662	1,663
Tobacco manufactures	59	57	58	57	56	57	57	57	56	55	55	56	56	56	55
Textile mill products	705	730	722	725	724	727	729	736	732	735	736	738	739	737	738
Apparel and other textile products	1,106	1,113	1,101	1,103	1,104	1,107	1,108	1,130	1,110	1,117	1,123	1,128	1,121	1,115	1,114
Paper and allied products	674	678	679	678	677	677	676	678	677	681	678	680	681	681	682
Printing and publishing	1,457	1,501	1,483	1,485	1,493	1,497	1,498	1,504	1,508	1,509	1,514	1,522	1,525	1,531	1,537
Chemicals and allied products	1,023	1,027	1,018	1,017	1,018	1,022	1,014	1,026	1,031	1,031	1,035	1,041	1,047	1,048	1,051
Petroleum and coal products	169	165	164	164	164	164	164	164	164	166	167	167	167	167	168
Rubber and misc. plastics products	790	818	805	807	809	809	810	815	819	824	833	840	845	845	846
Leather and leather products	151	151	147	148	149	150	149	155	152	152	152	152	153	153	153
SERVICE-PRODUCING	74,930	77,228	76,407	76,580	76,839	76,956	77,057	77,276	77,389	77,517	77,919	78,116	78,353	78,582	78,985
Transportation and public utilities	5,244	5,378	5,315	5,333	5,348	5,344	5,350	5,363	5,377	5,416	5,436	5,459	5,473	5,486	5,497
Transportation	3,041	3,150	3,097	3,112	3,124	3,120	3,128	3,133	3,147	3,183	3,198	3,218	3,233	3,245	3,257
Communication and public utilities	2,203	2,228	2,218	2,221	2,224	2,224	2,222	2,230	2,230	2,233	2,238	2,241	2,240	2,241	2,240
Wholesale trade	5,735	5,797	5,757	5,766	5,772	5,775	5,781	5,797	5,807	5,815	5,831	5,851	5,871	5,887	5,903
Durable goods	3,383	3,419	3,391	3,397	3,397	3,401	3,405	3,418	3,422	3,431	3,444	3,456	3,473	3,482	3,494
Nondurable goods	2,351	2,379	2,366	2,369	2,375	2,374	2,376	2,379	2,385	2,384	2,387	2,395	2,398	2,405	2,409
Retail trade	17,845	18,264	18,140	18,136	18,197	18,205	18,226	18,274	18,256	18,314	18,408	18,443	18,458	18,628	18,739
General merchandise stores	2,363	2,406	2,373	2,380	2,385	2,390	2,387	2,407	2,411	2,415	2,459	2,454	2,453	2,501	2,545
Food stores	2,873	2,959	2,940	2,944	2,953	2,956	2,960	2,959	2,962	2,958	2,969	2,982	2,996	3,021	3,037
Automotive dealers and service stations	1,943	1,987	1,979	1,979	1,978	1,978	1,983	1,985	1,985	1,988	2,000	2,003	2,013	2,021	2,037
Eating and drinking places	5,879	5,994	5,956	5,964	5,962	5,976	5,982	5,985	5,992	6,018	6,032	6,047	6,064	6,083	6,098
Finance, insurance, and real estate	6,297	6,589	6,501	6,526	6,558	6,576	6,586	6,608	6,624	6,629	6,650	6,657	6,668	6,681	6,677
Finance	3,152	3,278	3,243	3,256	3,272	3,276	3,280	3,291	3,293	3,292	3,296	3,301	3,301	3,307	3,296
Insurance	1,945	2,044	2,016	2,022	2,032	2,037	2,037	2,043	2,050	2,054	2,068	2,069	2,082	2,084	2,092
Real estate	1,200	1,267	1,242	1,248	1,254	1,263	1,269	1,274	1,281	1,283	1,286	1,287	1,285	1,290	1,289
Services	23,099	24,137	23,759	23,842	23,926	24,025	24,083	24,214	24,279	24,295	24,406	24,493	24,612	24,647	24,848
Business services	4,781	5,097	4,984	5,020	5,044	5,083	5,086	5,105	5,133	5,152	5,194	5,195	5,217	5,216	5,269
Health services	6,551	6,879	6,748	6,773	6,800	6,822	6,853	6,887	6,923	6,943	6,987	7,023	7,063	7,087	7,147
Government	16,711	17,063	16,935	16,977	17,038	17,031	17,031	17,020	17,046	17,048	17,188	17,213	17,271	17,253	17,321
Federal	2,899	2,943	2,916	2,922	2,933	2,935	2,935	2,936	2,940	2,962	2,965	2,977	2,981	2,982	2,989
State	3,888	3,952	3,927	3,930	3,943	3,947	3,932	3,952	3,964	3,957	3,973	3,978	3,996	3,994	4,007
Local	9,923	10,167	10,092	10,125	10,162	10,149	10,164	10,132	10,142	10,129	10,250	10,258	10,294	10,277	10,325

[p] = preliminary

NOTE: See notes on the data for a description of the most recent benchmark revision.

14. Average weekly hours of production or nonsupervisory workers on private nonagricultural payrolls by industry, monthly data seasonally adjusted

Industry	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.[p]	Feb.[p]
PRIVATE SECTOR	34.8	34.8	34.9	34.8	34.7	34.9	34.8	34.8	34.9	34.6	34.9	34.9	34.6	34.7	34.9
MANUFACTURING	40.7	41.0	41.1	40.9	40.6	41.0	41.0	41.0	41.0	40.6	41.3	41.2	41.0	41.1	40.9
Overtime hours	3.4	3.7	3.6	3.6	3.5	3.8	3.7	3.8	3.8	3.6	4.0	3.9	3.8	3.9	3.8
Durable goods	41.3	41.5	41.7	41.5	41.2	41.6	41.5	41.6	41.6	41.0	41.9	41.9	41.5	41.7	41.5
Overtime hours	3.5	3.8	3.7	3.7	3.6	3.9	3.8	3.8	4.0	3.7	4.1	4.0	3.9	4.0	3.9
Lumber and wood products	40.3	40.6	41.3	40.9	40.6	41.0	40.6	40.6	40.4	39.4	40.4	40.8	40.4	40.2	40.7
Furniture and fixtures	39.8	39.9	40.2	40.0	39.1	39.9	40.0	40.0	40.1	39.3	40.0	40.0	39.8	39.6	39.6
Stone, clay, and glass products	42.2	42.3	42.8	42.5	41.9	42.3	42.0	42.2	42.1	41.9	42.6	42.5	42.5	42.0	41.9
Primary metal industries	41.9	43.1	42.6	42.6	42.3	43.1	43.1	43.4	43.5	43.4	43.7	43.7	43.6	43.5	43.2
Blast furnaces and basic steel products	41.7	43.6	42.3	42.3	42.4	43.3	43.5	44.1	44.0	45.2	44.3	44.0	44.3	44.0	43.9
Fabricated metal products	41.3	41.5	41.6	41.5	41.2	41.6	41.5	41.4	41.5	40.8	42.0	42.1	41.7	41.9	41.5
Machinery except electrical	41.6	42.2	42.2	42.0	41.8	42.2	42.2	42.4	42.2	41.6	42.6	42.7	42.5	42.8	42.6
Electrical and electronic equipment	41.0	40.9	41.1	40.9	40.6	40.8	41.1	41.1	41.0	40.4	41.1	41.0	40.9	41.2	40.7
Transportation equipment	42.3	42.1	42.5	42.3	41.9	42.2	41.9	41.7	41.9	41.3	42.5	42.4	41.4	42.0	42.0
Motor vehicles and equipment	42.6	42.3	43.0	42.9	42.1	42.5	42.0	41.9	41.9	41.3	43.0	43.1	41.4	42.1	42.5
Instruments and related products	41.0	41.4	41.3	41.3	41.0	41.5	41.5	41.6	41.7	41.1	42.1	41.7	41.3	41.7	41.5
Nondurable goods	39.9	40.2	40.3	40.1	39.7	40.2	40.2	40.3	40.3	40.1	40.5	40.4	40.3	40.4	40.2
Overtime hours	3.3	3.6	3.5	3.5	3.3	3.7	3.6	3.7	3.7	3.6	3.8	3.8	3.7	3.8	3.6
Food and kindred products	40.0	40.2	40.1	40.0	39.8	40.1	40.1	39.9	40.3	40.2	40.5	40.6	40.6	40.7	40.3
Textile mill products	41.1	41.9	42.0	42.1	41.4	42.0	42.1	42.4	42.1	41.3	41.9	41.8	41.7	41.6	41.4
Apparel and other textile products	36.7	37.1	37.4	37.0	36.1	37.2	37.1	37.3	37.4	36.3	37.4	37.1	37.2	36.9	37.0
Paper and allied products	43.2	43.4	43.3	43.0	43.0	43.5	43.3	43.5	43.4	43.8	43.7	43.5	43.2	43.6	43.1
Printing and publishing	38.0	38.0	38.1	37.9	37.7	37.9	38.1	38.1	37.9	38.2	38.0	38.0	37.9	38.0	37.9
Chemicals and allied products	41.9	42.3	42.2	42.0	42.2	42.1	42.0	42.2	42.4	42.8	42.7	42.7	42.7	42.6	42.6
Petroleum and coal products	43.8	43.9	44.0	44.1	43.9	44.3	43.3	44.4	43.3	43.2	43.5	43.6	44.3	44.4	44.2
TRANSPORTATION AND PUBLIC UTILITIES	39.2	39.1	39.2	39.0	39.0	39.2	38.8	39.2	39.3	39.1	39.3	39.1	39.0	39.4	39.1
WHOLESALE TRADE	37.7	37.5	38.3	38.1	38.2	38.3	38.2	38.1	38.3	38.0	38.4	38.3	38.1	38.2	38.2
RETAIL TRADE	29.2	29.3	29.3	29.3	29.5	29.4	29.2	29.3	29.6	29.6	29.3	29.2	28.8	28.9	29.2
SERVICES	32.5	32.5	32.6	32.5	32.4	32.5	32.5	32.5	32.5	32.5	32.5	32.6	32.4	32.7	32.9

[p] = preliminary

NOTE: See "Notes on the data" for a description of the most recent benchmark adjustment.

15. Average hourly earnings of production or nonsupervisory workers on private nonagricultural payrolls by industry

Industry	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.[p]	Feb.[p]
PRIVATE SECTOR	$8.76	$8.98	$8.92	$8.92	$8.91	$8.93	$8.92	$8.91	$8.94	$9.06	$9.09	$9.14	$9.13	$9.18	$9.17
Seasonally adjusted	–	–	8.88	8.91	8.91	8.95	8.94	8.96	9.02	9.02	9.08	9.12	9.11	9.14	9.12
MINING	12.44	12.45	12.56	12.51	12.43	12.42	12.44	12.31	12.32	12.43	12.34	12.47	12.50	12.67	12.60
CONSTRUCTION	12.47	12.66	12.51	12.59	12.55	12.60	12.61	12.57	12.67	12.77	12.79	12.80	12.78	12.92	12.74
MANUFACTURING	9.73	9.91	9.84	9.85	9.87	9.87	9.87	9.87	9.86	10.00	9.95	10.01	10.08	10.07	10.07
Durable goods	10.29	10.45	10.39	10.39	10.39	10.40	10.42	10.40	10.42	10.53	10.51	10.57	10.63	10.62	10.61
Lumber and wood products	8.33	8.40	8.31	8.28	8.34	8.37	8.44	8.46	8.49	8.48	8.44	8.49	8.45	8.52	8.53
Furniture and fixtures	7.46	7.67	7.58	7.58	7.58	7.64	7.66	7.67	7.74	7.75	7.73	7.73	7.79	7.81	7.73
Stone, clay, and glass products	10.05	10.27	10.15	10.13	10.23	10.26	10.29	10.33	10.31	10.40	10.31	10.34	10.33	10.37	10.38
Primary metal industries	11.86	11.98	11.78	11.82	11.96	11.96	11.97	11.97	11.98	12.24	12.05	12.08	12.15	12.10	12.13
Blast furnaces and basic steel products	13.73	13.84	13.59	13.66	13.84	13.80	13.83	13.70	13.81	14.17	13.97	13.97	14.03	13.92	14.07
Fabricated metal products	9.89	10.03	9.99	9.99	9.98	9.97	10.00	9.95	9.97	10.04	10.11	10.15	10.24	10.19	10.18
Machinery, except electrical	10.59	10.77	10.68	10.72	10.70	10.70	10.76	10.74	10.76	10.81	10.86	10.89	10.96	10.92	10.91
Electrical and electronic equipment	9.65	9.90	9.84	9.84	9.82	9.83	9.84	9.89	9.90	9.98	9.95	10.00	10.05	10.01	10.01
Transportation equipment	12.81	12.96	12.88	12.86	12.80	12.85	12.88	12.83	12.90	13.07	13.09	13.18	13.26	13.22	13.20
Motor vehicles and equipment	13.45	13.57	13.49	13.49	13.40	13.42	13.47	13.36	13.43	13.69	13.73	13.82	13.90	13.96	13.92
Instruments and related products	9.47	9.74	9.67	9.67	9.67	9.69	9.70	9.74	9.78	9.80	9.81	9.87	9.88	9.92	9.95
Miscellaneous manufacturing	7.54	7.74	7.68	7.66	7.67	7.72	7.74	7.72	7.70	7.76	7.77	7.81	7.91	7.96	7.89
Nondurable goods	8.94	9.16	9.08	9.09	9.14	9.13	9.11	9.16	9.12	9.28	9.18	9.24	9.30	9.32	9.31
Food and kindred products	8.74	8.92	8.91	8.93	8.95	8.96	8.91	8.88	8.80	8.92	8.86	8.96	9.05	9.06	9.05
Tobacco manufactures	12.85	13.81	13.44	13.80	14.28	14.53	15.57	14.85	14.20	12.89	12.77	13.44	13.56	14.07	14.23
Textile mill products	6.93	7.18	7.11	7.12	7.12	7.13	7.15	7.14	7.16	7.23	7.24	7.31	7.33	7.38	7.36
Apparel and other textile products	5.84	5.95	5.93	5.93	5.94	5.89	5.91	5.89	5.90	6.01	5.99	6.00	6.01	6.04	6.04
Paper and allied products	11.18	11.42	11.26	11.27	11.37	11.40	11.41	11.48	11.41	11.67	11.48	11.50	11.54	11.50	11.49
Printing and publishing	9.99	10.28	10.16	10.17	10.14	10.19	10.19	10.25	10.31	10.48	10.42	10.39	10.44	10.41	10.44
Chemicals and allied products	11.98	12.37	12.21	12.24	12.30	12.31	12.27	12.37	12.34	12.56	12.52	12.56	12.62	12.54	12.49
Petroleum and coal products	14.18	14.57	14.51	14.50	14.50	14.52	14.43	14.48	14.52	14.71	14.66	14.75	14.72	14.91	14.89
Rubber and miscellaneous plastics products	8.73	8.88	8.79	8.80	8.82	8.84	8.87	8.93	8.90	8.98	8.91	8.93	9.00	8.97	8.97
Leather and leather products	5.92	6.06	6.01	6.06	6.12	6.05	6.04	5.98	6.01	6.09	6.09	6.11	6.11	6.11	6.16
TRANSPORTATION AND PUBLIC UTILITIES	11.70	12.01	11.93	11.90	11.94	11.95	11.91	12.00	12.04	12.09	12.09	12.17	12.17	12.12	12.14
WHOLESALE TRADE	9.35	9.61	9.55	9.53	9.53	9.57	9.57	9.57	9.62	9.67	9.67	9.74	9.74	9.79	9.81
RETAIL TRADE	6.03	6.12	6.09	6.08	6.09	6.09	6.08	6.07	6.06	6.20	6.16	6.19	6.19	6.23	6.22
FINANCE, INSURANCE, AND REAL ESTATE	8.35	8.76	8.75	8.72	8.71	8.72	8.68	8.69	8.81	8.79	8.81	8.94	8.87	9.01	9.05
SERVICES	8.16	8.47	8.43	8.41	8.40	8.38	8.35	8.33	8.40	8.55	8.61	8.71	8.73	8.78	8.80

– Data not available.
[p] = preliminary

NOTE: See "Notes on the data" for a description of the most recent benchmark revision.

16. Average weekly earnings of production or nonsupervisory workers on private nonagricultural payrolls by industry

Industry	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.[p]	Feb.[p]
PRIVATE SECTOR															
Current dollars	$304.85	$312.50	$307.74	$308.63	$308.29	$310.76	$312.20	$312.74	$315.58	$314.38	$317.24	$318.07	$318.64	$315.79	$317.28
Seasonally adjusted	–	–	309.91	310.07	309.18	312.36	311.11	311.81	314.80	312.09	316.89	318.29	315.21	317.16	318.29
Constant (1977) dollars	171.07	169.28	169.74	169.48	168.28	169.17	169.21	169.14	169.76	168.30	169.38	169.64	170.03	167.97	–
MINING	524.97	526.64	527.52	522.92	519.57	526.61	527.46	518.25	522.37	523.30	526.92	527.48	535.00	532.14	527.94
CONSTRUCTION	466.38	477.28	460.37	470.87	469.37	485.10	480.44	485.20	489.06	464.83	496.25	474.88	480.53	465.12	461.19
MANUFACTURING															
Current dollars	396.01	406.31	401.47	402.87	398.75	403.68	405.66	400.72	403.27	408.00	410.94	414.41	421.34	412.87	409.85
Constant (1977) dollars	222.23	220.10	221.44	221.24	217.78	219.75	219.87	216.72	216.93	218.42	219.40	221.02	224.83	219.61	–
Durable goods	424.98	433.68	431.19	432.22	427.03	431.60	434.51	426.40	430.35	432.78	439.32	443.94	450.71	441.79	438.19
Lumber and wood products	335.70	341.04	337.39	337.00	338.60	345.68	348.57	341.78	345.54	338.35	342.66	343.00	341.38	337.39	341.20
Furniture and fixtures	296.91	306.03	299.41	301.68	294.10	301.78	306.40	300.66	311.92	308.45	313.84	312.29	319.39	306.15	300.70
Stone, clay, and glass products	424.11	434.42	423.26	425.46	430.68	439.13	437.33	439.03	439.21	442.00	443.33	438.42	435.93	424.13	424.54
Primary metal industries	496.93	516.34	503.01	505.90	508.30	514.28	517.10	514.71	515.14	531.22	522.97	529.10	537.03	526.35	525.23
Blast furnaces and basic steel products	572.54	603.42	577.58	581.92	593.74	598.92	605.75	602.80	600.74	639.07	610.49	613.28	625.74	609.70	620.49
Fabricated metal products	408.46	416.25	413.59	414.59	408.18	412.76	417.00	405.96	411.76	410.64	424.62	429.35	437.25	425.94	420.43
Machinery, except electrical	440.54	454.49	449.63	452.38	445.12	449.40	455.15	447.86	449.77	449.70	460.46	467.18	477.86	467.38	463.68
Electrical and electronic equipment	395.65	404.91	402.46	402.46	395.75	399.10	404.42	399.56	403.92	404.19	408.95	414.00	422.10	413.41	405.41
Transportation equipment	541.86	545.62	546.11	547.84	536.32	542.27	539.67	526.03	530.19	538.48	553.71	561.47	566.20	557.88	553.08
Motor vehicles and equipment	572.97	574.01	577.37	582.77	566.82	571.69	567.09	549.10	547.94	562.66	586.27	594.26	596.31	591.90	588.82
Instruments and related products	388.27	403.24	399.37	401.31	394.54	399.23	402.55	398.37	403.91	402.78	410.06	414.54	418.91	413.66	412.93
Miscellaneous manufacturing	298.58	304.18	301.06	301.04	297.60	302.62	304.18	299.54	303.38	302.64	310.80	309.28	314.82	308.05	302.98
Nondurable goods	356.71	368.23	362.29	363.60	361.03	366.11	367.13	366.40	368.45	374.91	371.79	375.14	380.37	374.66	370.54
Food and kindred products	349.60	358.58	351.05	352.74	351.74	359.30	357.29	354.31	358.16	363.94	360.60	365.57	371.96	366.93	358.38
Tobacco manufactures	480.59	531.69	486.53	525.78	536.93	571.03	624.36	527.18	512.62	501.42	526.12	551.04	549.18	569.84	591.97
Textile mill products	284.82	300.84	295.78	299.04	291.21	298.75	303.16	297.02	302.87	301.49	305.53	308.48	310.06	305.53	301.76
Apparel and other textile products	214.33	220.75	220.00	219.41	212.65	219.11	221.03	217.93	220.66	218.16	224.63	224.40	225.98	221.67	221.67
Paper and allied products	482.98	495.63	484.18	483.48	486.64	493.62	494.05	495.94	492.91	514.65	501.68	502.55	508.91	501.40	491.77
Printing and publishing	379.62	390.64	384.05	386.46	381.26	384.16	384.16	387.45	392.81	403.48	397.00	397.94	404.03	392.46	392.54
Chemicals and allied products	501.96	523.25	514.04	515.30	519.06	518.25	516.57	518.30	519.51	537.57	530.85	537.57	545.18	534.20	530.83
Petroleum and coal products	621.08	639.62	629.73	636.55	635.10	637.43	624.82	645.81	631.62	644.30	642.11	646.05	652.10	657.53	649.20
Rubber and miscellaneous plastics products	360.55	369.41	364.79	365.20	360.74	366.86	370.77	366.13	368.46	371.77	373.33	375.95	382.50	375.84	371.36
Leather and leather products	218.45	230.89	223.57	227.25	224.60	233.53	237.37	230.83	233.79	229.59	235.68	234.01	235.24	229.74	226.07
TRANSPORTATION AND PUBLIC UTILITIES	458.64	469.59	465.27	462.91	463.27	466.05	465.68	472.80	476.78	473.93	475.14	477.06	477.06	471.47	472.25
WHOLESALE TRADE	359.04	367.10	361.95	361.19	363.09	366.53	367.49	366.53	369.41	368.43	371.33	373.04	373.04	372.02	371.80
RETAIL TRADE	176.08	179.32	174.78	175.71	177.83	178.44	179.97	182.10	183.62	183.52	179.87	179.51	181.37	176.31	177.89
FINANCE, INSURANCE, AND REAL ESTATE	303.94	317.11	318.50	316.54	316.17	316.54	315.95	314.58	320.68	316.44	318.92	324.52	319.32	326.16	331.23
SERVICES	265.20	275.28	273.13	272.48	271.32	271.51	272.21	273.22	276.36	277.02	279.83	283.08	282.85	285.35	287.76

– Data not available.
[p] = preliminary

NOTE: See "Notes on the data" for a description of the most recent benchmark revision.

17. The Hourly Earnings Index for production or nonsupervisory workers on private nonagricultural payrolls by industry

Industry	Not seasonally adjusted				Seasonally adjusted					
	Feb. 1987	Dec. 1987	Jan. 1988[p]	Feb. 1988[p]	Feb. 1987	Oct. 1987	Nov. 1987	Dec. 1987	Jan. 1988[p]	Feb. 1988[p]
PRIVATE SECTOR (in current dollars)	172.2	176.2	176.8	176.9	171.8	174.9	175.8	175.7	176.4	176.5
Mining[1]	181.7	183.7	184.8	184.2	–	–	–	–	–	–
Construction	151.8	155.5	156.7	156.5	152.4	154.7	156.6	154.4	156.8	157.1
Manufacturing	174.0	177.3	177.6	177.7	173.7	176.3	176.6	176.9	177.0	177.4
Transportation and public utilities	175.0	178.6	177.8	178.3	174.3	176.9	177.1	177.4	177.4	177.6
Wholesale trade[1]	176.0	179.7	180.3	180.3	–	–	–	–	–	–
Retail trade	159.4	162.5	162.8	162.8	158.9	162.2	162.3	162.7	162.8	162.4
Finance, insurance, and real estate[1]	187.8	190.9	193.9	194.2	–	–	–	–	–	–
Services	179.6	186.2	187.2	187.2	178.4	183.9	185.2	185.1	186.3	185.9
PRIVATE SECTOR [in constant (1977) dollars]	95.0	94.0	94.1	–	94.6	93.6	93.8	93.6	93.7	–

[1] This series is not seasonally adjusted because the seasonal component is small relative to the trend-cycle, irregular components, or both, and consequently cannot be separated with sufficient precision.
– Data not available.

[p] = preliminary.
NOTE: See "Notes on the data" for a description of the most recent benchmark revision.

18. Indexes of diffusion: industries in which employment increased, data seasonally adjusted

(In percent)

Time span and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Over 1-month span:												
1986	53.2	48.1	48.1	53.5	52.4	46.8	52.4	56.2	55.1	53.2	59.7	59.7
1987	53.5	56.8	58.6	58.4	58.6	55.7	68.6	54.6	65.4	65.4	71.9	63.2
1988	57.6	59.7	–	–	–	–	–	–	–	–	–	–
Over 3-month span:												
1986	49.7	44.9	45.7	48.4	47.6	45.4	48.4	55.1	55.9	58.1	58.6	60.3
1987	58.6	59.5	61.1	61.6	61.4	67.3	66.2	75.1	69.7	77.8	75.9	70.0
1988	65.9	–	–	–	–	–	–	–	–	–	–	–
Over 6-month span:												
1986	47.6	47.6	43.0	43.2	45.4	48.4	47.3	53.0	59.2	58.9	57.8	58.9
1987	61.9	62.7	58.9	67.3	67.6	71.1	76.2	78.6	80.3	74.9	76.5	–
1988	–	–	–	–	–	–	–	–	–	–	–	–
Over 12-month span:												
1986	43.2	44.1	46.2	45.7	47.8	49.5	49.5	51.6	54.9	52.2	55.1	56.5
1987	62.2	63.5	67.3	68.9	73.8	72.4	76.2	76.5	–	–	–	–
1988	–	–	–	–	–	–	–	–	–	–	–	–

– Data not available.

NOTE: Figures are the percent of industries with employment rising. (Half of the unchanged components are counted as rising.) Data are centered within the spans. Data for the 2 most recent months shown in each span are preliminary. See the "Definitions" in this section. See "Notes on the data" for a description of the most recent benchmark revision.

19. Annual data: Employment status of the noninstitutional population

(Numbers in thousands)

Employment status	1979	1980	1981	1982	1983	1984	1985	1986	1987
Noninstitutional population	166,460	169,349	171,775	173,939	175,891	178,080	179,912	182,293	184,490
Labor force:									
Total (number)	106,559	108,544	110,315	111,872	113,226	115,241	117,167	119,540	121,602
Percent of population	64.0	64.1	64.2	64.3	64.4	64.7	65.1	65.6	65.9
Employed:									
Total (number)	100,421	100,907	102,042	101,194	102,510	106,702	108,856	111,303	114,177
Percent of population	60.3	59.6	59.4	58.2	58.3	59.9	60.5	61.1	61.9
Resident Armed Forces	1,597	1,604	1,645	1,668	1,676	1,697	1,706	1,706	1,737
Civilian									
Total	98,824	99,303	100,397	99,526	100,834	105,005	107,150	109,597	112,440
Agriculture	3,347	3,364	3,368	3,401	3,383	3,321	3,179	3,163	3,208
Nonagricultural industries	95,477	95,938	97,030	96,125	97,450	101,685	103,971	106,434	109,232
Unemployed:									
Total (number)	6,137	7,637	8,273	10,678	10,717	8,539	8,312	8,237	7,425
Percent of labor force	5.8	7.0	7.5	9.5	9.5	7.4	7.1	6.9	6.1
Not in labor force (number)	59,900	60,806	61,460	62,067	62,665	62,839	62,744	62,752	62,888

20. Annual data: Employment levels by industry

(Numbers in thousands)

Industry	1979	1980	1981	1982	1983	1984	1985	1986	1987
Total employment	89,823	90,406	91,156	89,566	90,200	94,496	97,519	99,610	102,112
Private sector	73,876	74,166	75,126	73,729	74,330	78,472	81,125	82,900	85,049
Goods-producing	26,461	25,658	25,497	23,813	23,334	24,727	24,859	24,681	24,884
Mining	958	1,027	1,139	1,128	952	966	927	783	741
Construction	4,463	4,346	4,188	3,905	3,948	4,383	4,673	4,904	5,031
Manufacturing	21,040	20,285	20,170	18,781	18,434	19,378	19,260	18,994	19,112
Service-producing	63,363	64,748	65,659	65,753	66,866	69,769	72,660	74,930	77,228
Transportation and public utilities	5,136	5,146	5,165	5,082	4,954	5,159	5,238	5,244	5,378
Wholesale trade	5,204	5,275	5,358	5,278	5,268	5,555	5,717	5,735	5,797
Retail trade	14,989	15,035	15,199	15,179	15,613	16,545	17,356	17,845	18,264
Finance, insurance, and real estate	4,975	5,160	5,298	5,341	5,468	5,689	5,955	6,297	6,589
Services	17,112	17,890	18,619	19,036	19,694	20,797	22,000	23,099	24,137
Government	15,947	16,241	16,031	15,837	15,869	16,024	16,394	16,711	17,063
Federal	2,773	2,866	2,772	2,739	2,774	2,807	2,875	2,899	2,943
State	3,541	3,610	3,640	3,640	3,662	3,734	3,832	3,888	3,952
Local	9,633	9,765	9,619	9,458	9,434	9,482	9,687	9,923	10,167

NOTE: See "Notes on the data" for a description of the most recent benchmark revision.

21. Annual data: Average hours and earnings of production or nonsupervisory workers on nonagricultural payrolls, by industry

Industry	1979	1980	1981	1982	1983	1984	1985	1986	1987
Private sector									
Average weekly hours	35.7	35.3	35.2	34.8	35.0	35.2	34.9	34.8	34.8
Average hourly earnings (in dollars)	6.16	6.66	7.25	7.68	8.02	8.32	8.57	8.76	8.98
Average weekly earnings (in dollars)	219.91	235.10	255.20	267.26	280.70	292.86	299.09	304.85	312.50
Mining									
Average weekly hours	43.0	43.3	43.7	42.7	42.5	43.3	43.4	42.2	42.3
Average hourly earnings (in dollars)	8.49	9.17	10.04	10.77	11.28	11.63	11.98	12.44	12.45
Average weekly earnings (in dollars)	365.07	397.06	438.75	459.88	479.40	503.58	519.93	524.97	526.64
Construction									
Average weekly hours	37.0	37.0	36.9	36.7	37.1	37.8	37.7	37.4	37.7
Average hourly earnings (in dollars)	9.27	9.94	10.82	11.63	11.94	12.13	12.32	12.47	12.66
Average weekly earnings (in dollars)	342.99	367.78	399.26	426.82	442.97	458.51	464.46	466.38	477.28
Manufacturing									
Average weekly hours	40.2	39.7	39.8	38.9	40.1	40.7	40.5	40.7	41.0
Average hourly earnings (in dollars)	6.70	7.27	7.99	8.49	8.83	9.19	9.54	9.73	9.91
Average weekly earnings (in dollars)	269.34	288.62	318.00	330.26	354.08	374.03	386.37	396.01	406.31
Transportation and public utilities									
Average weekly hours	39.9	39.6	39.4	39.0	39.0	39.4	39.5	39.2	39.1
Average hourly earnings (in dollars)	8.16	8.87	9.70	10.32	10.79	11.12	11.40	11.70	12.01
Average weekly earnings (in dollars)	325.58	351.25	382.18	402.48	420.81	438.13	450.30	458.64	469.59
Wholesale trade									
Average weekly hours	38.8	38.5	38.5	38.3	38.5	38.5	38.4	38.4	38.2
Average hourly earnings (in dollars)	6.39	6.96	7.56	8.09	8.55	8.89	9.16	9.35	9.61
Average weekly earnings (in dollars)	247.93	267.96	291.06	309.85	329.18	342.27	351.74	359.04	367.10
Retail trade									
Average weekly hours	30.6	30.2	30.1	29.9	29.8	29.8	29.4	29.2	29.3
Average hourly earnings (in dollars)	4.53	4.88	5.25	5.48	5.74	5.85	5.94	6.03	6.12
Average weekly earnings (in dollars)	138.62	147.38	158.03	163.85	171.05	174.33	174.64	176.08	179.32
Finance, insurance, and real estate									
Average weekly hours	36.2	36.2	36.3	36.2	36.2	36.5	36.4	36.4	36.2
Average hourly earnings (in dollars)	5.27	5.79	6.31	6.78	7.29	7.63	7.94	8.35	8.76
Average weekly earnings (in dollars)	190.77	209.60	229.05	245.44	263.90	278.50	289.02	303.94	317.11
Services									
Average weekly hours	32.7	32.6	32.6	32.6	32.7	32.6	32.5	32.5	32.5
Average hourly earnings (in dollars)	5.36	5.85	6.41	6.92	7.31	7.59	7.90	8.16	8.47
Average weekly earnings (in dollars)	175.27	190.71	208.97	225.59	239.04	247.43	256.75	265.20	275.28

22. Employment Cost Index, compensation,[1] by occupation and industry group

(June 1981 = 100)

Series	1985	1986				1987				Percent change	
	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	3 months ended	12 months ended
										Dec. 1987	
Civilian workers [2]	129.2	130.6	131.5	133.0	133.8	135.0	135.9	137.5	138.6	0.8	3.6
Workers, by occupational group:											
White-collar workers	131.6	133.1	134.2	136.0	136.9	138.5	139.3	141.2	142.2	.7	3.9
Blue-collar workers	124.9	126.2	126.8	127.8	128.4	129.1	130.1	131.3	132.5	.9	3.2
Service occupations	131.8	133.1	133.7	135.4	136.6	138.0	138.5	139.9	140.8	.6	3.1
Workers, by industry division:											
Goods-producing	125.5	126.9	128.1	128.8	129.5	130.2	131.1	132.2	133.5	1.0	3.1
Manufacturing	126.0	127.7	128.7	129.3	130.1	130.7	131.5	132.7	134.1	1.1	3.1
Service-producing	131.5	132.9	133.7	135.6	136.5	138.1	138.9	140.8	141.7	.6	3.8
Services	137.1	138.8	139.4	142.4	143.6	145.2	145.8	149.2	150.6	.9	4.9
Health services	–	–	–	–	–	–	–	–	–	1.2	4.4
Hospitals	–	–	–	–	–	–	–	–	–	1.2	4.8
Public administration [3]	134.8	136.8	138.0	140.6	141.6	144.1	144.7	146.4	148.1	1.2	4.6
Nonmanufacturing	130.6	131.9	132.8	134.6	135.4	136.9	137.8	139.6	140.5	.6	3.8
Private industry workers	127.5	128.9	129.9	130.8	131.6	132.9	133.8	135.1	136.0	.7	3.3
Workers, by occupational group:											
White-collar workers	129.8	131.3	132.5	133.5	134.3	136.1	137.0	138.5	139.3	.6	3.7
Professional specialty and technical occupations	–	–	–	–	–	–	–	–	–	.9	4.1
Executive, administrative, and managerial occupations	–	–	–	–	–	–	–	–	–	.5	4.4
Sales occupations	–	–	–	–	–	–	–	–	–	–.3	1.2
Administrative support occupations, including clerical	–	–	–	–	–	–	–	–	–	.9	4.1
Blue-collar workers	124.4	125.7	126.3	127.2	127.8	128.4	129.5	130.6	131.8	.9	3.1
Precision production, craft, and repair occupation	–	–	–	–	–	–	–	–	–	.8	3.1
Machine operators, assemblers, and inspectors	–	–	–	–	–	–	–	–	–	1.3	3.4
Transportation and material moving occupations	–	–	–	–	–	–	–	–	–	.6	2.9
Handlers, equipment cleaners, helpers, and laborers	–	–	–	–	–	–	–	–	–	1.1	2.8
Service occupations	129.5	130.9	131.1	132.3	133.5	134.7	135.2	135.9	136.7	.6	2.4
Workers, by industry division:											
Goods-producing	125.3	126.7	127.8	128.6	129.2	129.9	130.8	131.9	133.2	1.0	3.1
Construction	–	–	–	–	–	–	–	–	–	.7	3.7
Manufacturing	126.0	127.7	128.7	129.3	130.1	130.7	131.5	132.7	134.1	1.1	3.1
Durables	–	–	–	–	–	–	–	–	–	1.0	2.7
Nondurables	–	–	–	–	–	–	–	–	–	1.2	3.8
Service-producing	129.4	130.8	131.6	132.7	133.5	135.3	136.3	137.7	138.4	.5	3.7
Transportation and public utilities	–	–	–	–	–	–	–	–	–	.4	3.0
Transportation	–	–	–	–	–	–	–	–	–	.2	2.7
Public utilities	–	–	–	–	–	–	–	–	–	.6	3.3
Wholesale and retail trade	–	–	–	–	–	–	–	–	–	.2	3.0
Wholesale trade	–	–	–	–	–	–	–	–	–	.7	4.0
Retail trade	–	–	–	–	–	–	–	–	–	.1	2.5
Finance, insurance, and real estate	–	–	–	–	–	–	–	–	–	.1	2.0
Service	–	–	–	–	–	–	–	–	–	1.0	5.2
Health services	–	–	–	–	–	–	–	–	–	1.2	4.3
Hospitals	–	–	–	–	–	–	–	–	–	1.3	4.9
Nonmanufacturing	128.4	129.7	130.6	131.7	132.4	134.1	135.1	136.4	137.1	.5	3.5
State and local government workers	137.5	138.9	139.7	143.6	144.7	145.9	146.3	149.7	151.1	.9	4.4
Workers, by occupational group:											
White-collar workers	138.6	140.0	140.5	145.0	146.0	147.2	147.5	151.2	152.7	1.0	4.6
Blue-collar workers	132.7	134.7	136.3	138.5	139.5	140.8	141.3	143.3	144.3	.7	3.4
Workers, by industry division:											
Services	139.1	140.4	140.8	145.5	146.6	147.3	147.6	151.8	153.1	.9	4.4
Hospitals and other services [4]	135.2	136.8	137.9	139.4	141.1	142.5	143.3	145.1	146.3	.8	3.7
Health services	–	–	–	–	–	–	–	–	–	1.1	4.7
Schools	140.3	141.5	141.7	147.6	148.4	148.9	149.1	154.1	155.5	.9	4.8
Elementary and secondary	142.0	143.0	143.2	149.4	150.3	150.5	150.7	156.5	157.8	.8	5.0
Public administration [3]	134.8	136.8	138.0	140.6	141.6	144.1	144.7	146.4	148.1	1.2	4.6

[1] Cost (cents per hour worked) measured in the Employment Cost Index consists of wages, salaries, and employer cost of employee benefits.

[2] Consist of private industry workers (excluding farm and household workers) and State and local government (excluding Federal Government) workers.

[3] Consist of legislative, judicial, administrative, and regulatory activities.

[4] Includes, for example, library, social, and health services.

– Data not available.

23. Employment Cost Index, wages and salaries, by occupation and industry group

(June 1981 = 100)

Series	1985	1986				1987				Percent change	
	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	3 months ended	12 months ended
										Dec. 1987	
Civilian workers [1]	127.0	128.3	129.3	130.7	131.5	132.8	133.5	135.2	136.1	0.7	3.5
Workers, by occupational group:											
White-collar workers	129.8	131.2	132.4	134.1	135.0	136.6	137.3	139.4	140.2	.6	3.9
Blue-collar workers	122.3	123.4	124.1	125.0	125.6	126.2	127.1	128.3	129.4	.9	3.0
Service occupations	128.6	129.8	130.0	131.7	132.8	134.2	134.7	136.0	136.6	.4	2.9
Workers, by industry division											
Goods-producing	123.1	124.4	125.6	126.3	127.0	127.8	128.5	129.8	131.0	.9	3.1
Manufacturing	123.8	125.3	126.5	127.2	127.9	128.7	129.5	130.8	132.2	1.1	3.4
Service-producing	129.4	130.7	131.5	133.4	134.2	135.8	136.5	138.5	139.2	.5	3.7
Services	134.8	136.4	137.0	139.9	141.1	142.7	143.4	146.8	148.2	1.0	5.0
Health services	–	–	–	–	–	–	–	–	–	1.1	4.6
Hospitals	–	–	–	–	–	–	–	–	–	1.2	5.0
Public administration [2]	132.0	133.8	134.6	137.5	138.1	140.5	141.0	142.6	143.8	.8	4.1
Nonmanufacturing	128.4	129.6	130.4	132.2	133.0	134.5	135.2	137.1	137.8	.5	3.6
Private industry workers	125.6	126.8	127.9	128.8	129.5	130.8	131.7	133.0	133.8	.6	3.3
Workers, by occupational group:											
White-collar workers	128.3	129.6	131.1	132.0	132.7	134.6	135.4	137.0	137.6	.4	3.7
Professional specialty and technical occupations	131.5	132.7	134.0	135.4	136.4	138.4	139.1	141.2	142.6	1.0	4.5
Executive, administrative, and managerial occupations	128.4	130.5	132.1	132.4	133.5	135.6	136.4	138.6	139.2	.4	4.3
Sales occupations	122.5	122.4	124.3	125.2	124.9	126.7	127.1	127.0	126.1	-.7	1.0
Administrative support occupations, including clerical	127.9	129.6	130.8	131.7	132.7	134.3	135.5	137.1	138.1	.7	4.1
Blue-collar workers	122.0	123.1	123.7	124.5	125.1	125.6	126.6	127.7	128.9	.9	3.0
Precision production, craft, and repair occupations	123.8	125.3	125.7	126.7	127.4	127.9	128.8	130.2	131.1	.7	2.9
Machine operators, assemblers, and inspectors	121.6	122.6	123.6	124.1	124.9	125.5	126.7	127.5	129.2	1.3	3.4
Transportation and material moving occupations	117.8	118.0	118.9	119.8	120.1	120.5	121.5	122.3	122.9	.5	2.3
Handlers, equipment cleaners, helpers, and laborers	119.8	120.0	120.3	120.9	121.4	121.9	122.6	123.7	125.0	1.1	3.0
Service occupations	126.6	128.0	128.0	128.9	130.1	131.4	131.9	132.6	133.2	.5	2.4
Workers, by industry division:											
Goods-producing	122.9	124.2	125.4	126.1	126.8	127.5	128.3	129.6	130.8	.9	3.2
Construction	117.9	118.3	119.8	120.5	120.8	121.7	122.7	123.8	124.7	.7	3.2
Manufacturing	123.8	125.3	126.5	127.2	127.9	128.7	129.5	130.8	132.2	1.1	3.4
Durables	123.4	124.8	125.8	126.4	127.2	127.7	128.7	129.7	131.1	1.1	3.1
Nondurables	124.6	126.1	127.9	128.5	129.3	130.5	131.0	132.8	134.1	1.0	3.7
Service-producing	127.8	129.0	129.9	130.9	131.6	133.4	134.3	135.7	136.2	.4	3.5
Transportation and public utilities	125.2	126.3	126.6	127.3	127.5	128.1	129.3	130.0	130.2	.2	2.1
Transportation	–	–	–	–	–	–	–	–	–	-.2	1.7
Public utilities	–	–	–	–	–	–	–	–	–	.6	2.6
Wholesale and retail trade	123.7	124.5	125.8	126.5	126.9	127.9	129.9	130.6	130.7	.1	3.0
Wholesale trade	128.3	129.7	131.2	131.8	133.1	134.8	137.2	137.8	138.5	.5	4.1
Retail trade	121.9	122.5	123.7	124.4	124.5	125.2	127.1	127.8	127.7	-.1	2.6
Finance, insurance, and real estate	126.5	126.6	128.0	129.0	130.0	133.5	131.5	131.8	131.6	-.2	1.2
Services	134.1	136.2	136.9	138.2	139.5	141.8	142.8	145.9	147.1	.8	5.4
Health services	–	–	–	–	–	–	–	–	–	1.1	4.6
Hospitals	–	–	–	–	–	–	–	–	–	1.2	5.1
Nonmanufacturing	126.6	127.7	128.7	129.7	130.4	131.9	132.8	134.2	134.8	.4	3.4
State and local government workers	134.2	135.5	136.0	140.4	141.4	142.5	142.8	146.1	147.4	.9	4.2
Workers, by occupational group											
White-collar workers	135.3	136.6	137.0	141.8	142.8	143.9	144.1	147.7	149.3	1.1	4.6
Blue-collar workers	128.4	130.4	131.9	134.5	135.1	136.3	136.9	139.0	139.6	.4	3.3
Workers, by industry division											
Services	135.6	136.8	137.1	142.1	143.3	143.9	144.2	148.2	149.5	.9	4.3
Hospitals and other services [3]	130.9	132.4	133.3	135.8	137.3	138.6	139.4	141.2	142.2	.7	3.6
Health services	–	–	–	–	–	–	–	–	–	1.0	4.4
Schools	137.0	138.0	138.2	144.1	145.1	145.5	145.6	150.3	151.8	1.0	4.6
Elementary and secondary	138.5	139.4	139.4	145.7	146.4	146.5	146.6	152.0	153.4	.9	4.8
Public administration [2]	132.0	133.8	134.6	137.5	138.1	140.5	141.0	142.6	143.8	.8	4.1

[1] Consists of private industry workers (excluding farm and household workers) and State and local government (excluding Federal Government) workers.

[2] Consists of legislative, judicial, administrative, and regulatory activities.

[3] Includes, for example, library, social and health services.

– Data not available.

24. Employment Cost Index, private nonfarm workers, by bargaining status, region, and area size

(June 1981 = 100)

Series	1985	1986				1987				Percent change	
	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	3 months ended	12 months ended
										Dec. 1987	
COMPENSATION											
Workers, by bargaining status[1]											
Union	127.1	128.4	128.7	129.4	129.8	130.5	131.2	132.0	133.4	1.1	2.8
Goods-producing	125.2	126.4	126.7	127.3	127.5	128.0	128.7	129.5	131.3	1.4	3.0
Service-producing	130.2	131.6	131.9	132.8	133.4	134.4	135.2	135.9	136.7	.6	2.5
Manufacturing	125.5	127.0	126.9	127.5	127.9	128.0	128.7	129.5	131.5	1.5	2.8
Nonmanufacturing	128.6	129.7	130.4	131.2	131.5	132.6	133.5	134.3	135.1	.6	2.7
Nonunion	127.5	129.0	130.2	131.2	132.1	133.6	134.6	136.1	136.9	.6	3.6
Goods-producing	125.1	126.7	128.2	129.1	130.0	130.8	131.8	133.1	134.1	.8	3.2
Service-producing	129.0	130.4	131.4	132.5	133.4	135.3	136.4	137.9	138.6	.5	3.9
Manufacturing	126.3	128.1	129.7	130.4	131.4	132.2	133.2	134.6	135.6	.7	3.2
Nonmanufacturing	128.1	129.5	130.4	131.6	132.5	134.3	135.3	136.8	137.5	.5	3.8
Workers, by region [1]											
Northeast	129.9	131.6	133.3	134.2	135.2	137.4	138.6	140.3	141.9	1.1	5.0
South	127.2	128.7	129.6	130.7	131.4	132.1	133.2	134.2	135.4	.9	3.0
Midwest (formerly North Central)	124.6	125.9	126.2	127.3	128.1	129.1	130.2	131.2	131.7	.4	2.8
West	129.8	130.8	131.6	132.1	132.8	134.1	134.2	135.8	136.3	.4	2.6
Workers, by area size [1]											
Metropolitan areas	128.1	129.5	130.5	131.4	132.2	133.5	134.4	135.8	136.7	.7	3.4
Other areas	123.9	125.5	126.4	127.2	127.9	129.0	130.2	131.3	132.0	.5	3.2
WAGES AND SALARIES											
Workers, by bargaining status [1]											
Union	124.7	125.6	126.1	126.9	127.2	127.7	128.3	129.1	130.5	1.1	2.6
Goods-producing	122.7	123.4	124.1	124.5	124.8	125.0	125.8	126.5	128.5	1.6	3.0
Service-producing	127.8	129.0	129.3	130.5	130.9	131.7	132.2	132.9	133.6	.5	2.1
Manufacturing	123.3	124.2	124.6	125.0	125.5	125.6	126.2	127.0	129.3	1.8	3.0
Nonmanufacturing	125.9	126.9	127.4	128.5	128.7	129.5	130.1	130.8	131.5	.5	2.2
Nonunion	125.9	127.3	128.5	129.4	130.3	131.8	132.8	134.3	135.0	.5	3.6
Goods-producing	123.0	124.5	126.1	127.0	127.8	128.8	129.6	131.1	132.1	.8	3.4
Service-producing	127.7	128.9	129.9	130.8	131.7	133.6	134.6	136.2	136.7	.4	3.8
Manufacturing	124.4	126.1	127.7	128.5	129.5	130.6	131.5	133.0	133.9	.7	3.4
Nonmanufacturing	126.6	127.8	128.9	129.8	130.6	132.4	133.4	134.9	135.4	.4	3.7
Workers, by region [1]											
Northeast	128.1	129.2	131.3	132.3	133.1	135.4	136.6	138.3	139.7	1.0	5.0
South	125.4	126.8	127.8	128.8	129.4	130.1	131.1	132.1	133.0	.7	2.8
Midwest (formerly North Central)	122.9	124.2	124.4	125.3	126.2	127.4	128.5	129.6	129.9	.2	2.9
West	127.1	128.1	128.9	129.3	130.1	131.2	131.1	133.1	133.5	.3	2.6
Workers, by area size[1]											
Metropolitan areas	126.3	127.4	128.5	129.4	130.2	131.6	132.4	133.7	134.6	.7	3.4
Other areas	122.0	123.6	124.5	125.0	125.6	126.6	127.8	129.1	129.8	.5	3.3

[1] The indexes are calculated differently from those for the occupation and industry groups. For a detailed description of the index calculation, see the *Monthly Labor Review* Technical Note, "Estimation procedures for the Employment Cost Index," May 1982.

25. Specified compensation and wage adjustments from contract settlements, and effective wage adjustments, private industry collective bargaining situations covering 1,000 workers or more (in percent)

Measure	Annual average		Quarterly average							
	1985	1986	1986				1987			
			I	II	III	IV	I	II[p]	III[p]	IV[p]
Specified adjustments:										
Total compensation [1] adjustments, [2] settlements covering 5,000 workers or more:										
First year of contract	2.6	1.1	0.6	0.7	0.7	2.7	1.7	4.1	2.5	3.4
Annual rate over life of contract	2.7	1.6	1.2	1.6	1.2	2.4	2.4	3.9	2.1	2.4
Wage adjustments, settlements covering 1,000 workers or more:										
First year of contract	2.3	1.2	.8	1.3	.8	2.0	1.2	2.6	2.1	2.4
Annual rate over life of contract	2.7	1.8	1.5	2.0	1.5	2.1	1.8	2.9	2.0	1.8
Effective adjustments:										
Total effective wage adjustment [3]	3.3	2.3	.6	.7	.5	.5	.4	1.0	.9	.8
From settlements reached in period	.7	.5	(4)	.2	.1	.2	(4)	.2	.2	.3
Deferred from settlements reached in earlier periods	1.8	1.7	.4	.6	.5	.2	.3	.7	.6	.3
From cost-of-living-adjustments clauses	.7	.2	.2	(4)	(4)	.1	.1	.2	.1	.2

[1] Compensation includes wages, salaries, and employers' cost of employee benefits when contract is negotiated.

[2] Adjustments are the net result of increases, decreases, and no changes in compensation or wages.

[3] Because of rounding, total may not equal sum of parts.

[4] Between −0.05 and 0.05 percent.

[p] = preliminary.

26. Average specified compensation and wage adjustments, major collective bargaining settlements in private industry situations covering 1,000 workers or more during 4-quarter periods (in percent)

Measure	Average for four quarters ending--							
	1986				1987			
	I	II	III	IV	I	IIP	IIIP	IVP
Specified total compensation adjustments, settlements covering 5,000 workers or more, all industries:								
First year of contract	2.3	1.4	0.9	1.1	1.2	1.9	2.8	3.1
Annual rate over life of contract	2.5	2.0	1.4	1.6	1.7	2.1	2.6	2.6
Specified wage adjustments, settlements covering 1,000 workers or more:								
All industries								
First year of contract	2.0	1.6	1.2	1.2	1.2	1.5	2.1	2.2
Contracts with COLA clauses	1.6	1.8	2.2	1.9	2.0	1.8	2.1	2.3
Contracts without COLA clauses	2.2	1.5	.8	.9	.9	1.4	2.1	2.2
Annual rate over life of contract	2.5	2.2	1.7	1.8	1.8	2.0	2.2	2.1
Contracts with COLA clauses	2.5	2.5	2.0	1.7	1.8	1.7	1.7	1.5
Contracts without COLA clauses	2.5	2.1	1.6	1.8	1.8	2.2	2.6	2.6
Manufacturing								
First year of contract	.8	.1	-1.0	-1.2	-1.5	-.8	1.1	2.1
Contracts with COLA clauses	.8	.7	1.1	1.3	1.3	1.3	2.1	2.4
Contracts without COLA clauses	.9	-.4	-2.0	-2.8	-3.5	-2.7	-.1	1.3
Annual rate over life of contract	1.8	1.4	.3	.2	(2)	.3	1.0	1.3
Contracts with COLA clauses	2.1	2.0	1.1	.9	.8	.8	1.0	1.0
Contracts without COLA clauses	1.5	.9	-.1	-.2	-.6	-.2	1.2	2.1
Nonmanufacturing								
First year of contract	2.8	2.6	2.1	2.0	2.2	2.3	2.5	2.4
Contracts with COLA clauses	3.5	3.4	2.7	2.1	2.2	2.1	2.1	1.9
Contracts without COLA clauses	2.7	2.4	1.9	2.0	2.2	2.4	2.7	2.5
Annual rate over life of contract	3.0	2.8	2.3	2.3	2.4	2.6	2.8	2.7
Contracts with COLA clauses	3.6	3.3	2.5	2.1	2.2	2.2	2.4	2.7
Contracts without COLA clauses	2.8	2.6	2.2	2.4	2.6	2.8	3.0	2.8
Construction								
First year of contract	1.6	2.3	2.3	2.2	2.4	2.7	3.0	2.9
Contracts with COLA clauses	(1)	1.1	1.4	1.4	1.6	3.7	(1)	(1)
Contracts without COLA clauses	(1)	2.4	2.4	2.3	2.4	2.7	(1)	(1)
Annual rate over life of contract	2.2	2.5	2.6	2.5	2.5	2.9	3.2	3.1
Contracts with COLA clauses	(1)	1.2	1.6	1.6	1.4	3.8	(1)	(1)
Contracts without COLA clauses	(1)	2.6	2.6	2.5	2.6	2.9	(1)	(1)

[1] Data do not meet publication standards.

[2] Between -0.05 and 0.05 percent.

P = preliminary.

27. Average effective wage adjustments, private industry collective bargaining situations covering 1,000 workers or more during 4-quarter periods (in percent)

Effective wage adjustment	Average for four quarters ending--						
	1986			1987			
	II	III	IV	I	IIP	IIIP	IVP
For all workers:[1]							
Total	2.9	2.3	2.3	2.0	2.2	2.6	3.1
From settlements reached in period	.5	.5	.5	.4	.3	.5	.7
Deferred from settlements reached in earlier period	1.8	1.6	1.7	1.5	1.6	1.7	1.8
From cost-of-living-adjustments clauses	.7	.2	.2	.1	.3	.4	.5
For workers receiving changes:							
Total	3.8	3.1	2.8	2.5	2.8	3.2	3.6
From settlements reached in period	2.5	1.7	1.6	1.2	1.0	1.9	2.9
Deferred from settlements reached in earlier period	3.4	3.8	3.9	3.7	3.5	3.3	3.3
From cost-of-living-adjustments clauses	2.0	1.0	1.0	.6	1.8	2.3	2.6

[1] Because of rounding, total may not equal sum of parts.

P = preliminary.

28. Specified compensation and wage adjustments from contract settlements, and effective wage adjustments, State and local government collective bargaining situations covering 1,000 workers or more (in percent)

Measure	Annual average		
	1985	1986	1987
Specified adjustments:			
Total compensation [1] adjustments, [2] settlements covering 5,000 workers or more:			
First year of contract	4.2	6.2	4.9
Annual rate over life of contract	5.1	6.0	4.8
Wage adjustments, settlements covering 1,000 workers or more:			
First year of contract	4.6	5.7	4.9
Annual rate over life of contract	5.4	5.7	5.1
Effective adjustments:			
Total effective wage adjustment [3]	5.7	5.5	4.9
From settlements reached in period	4.1	2.4	2.6
Deferred from settlements reached in earlier periods	1.6	3.0	2.2
From cost-of-living-adjustment clauses	([4])	([4])	([4])

[1] Compensation includes wages, salaries, and employers' cost of employee benefits when contract is negotiated.

[2] Adjustments are the net result of increases, decreases, and no changes in compensation or wages.

[3] Because of rounding, total may not equal sum of parts.

[4] Less than 0.05 percent.

29. Work stoppages involving 1,000 workers or more

Measure	Annual totals		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.[p]	Feb.[p]
Number of stoppages:															
Beginning in period	69	46	5	3	2	3	8	6	3	7	1	6	0	2	5
In effect during period	72	51	7	5	5	7	12	14	11	15	12	11	5	5	8
Workers involved:															
Beginning in period (in thousands)	533.0	174.4	37.6	12.2	2.7	7.0	16.1	8.4	18.4	45.9	1.3	11.8	.0	6.2	17.5
In effect during period (in thousands)	899.5	377.7	41.6	16.2	8.9	13.9	25.8	31.1	36.0	71.9	53.7	22.2	8.9	9.8	21.1
Days idle:															
Number (in thousands)	1,186.1	4,480.8	194.1	104.4	151.3	201.2	278.0	471.0	361.4	1,155.1	353.3	222.9	159.4	87.0	337.0
Percent of estimated working time[1]	.05	.02	.01	.01	.01	.01	.01	.02	.02	.05	.02	.01	.01	.02	.02

[1] Agricultural and government employees are included in the total employed and total working time: private household, forestry, and fishery employees are excluded. An explanation of the measurement of idleness as a percentage of the total time worked is found in "'Total economy' measure of strike idleness," *Monthly Labor Review,* October 1968, pp. 54-56.

[p] = preliminary

30. Consumer Price Indexes for All Urban Consumers and for Urban Wage Earners and Clerical Workers: U.S. city average, by expenditure category and commodity or service group

(1982-84=100, unless otherwise indicated)

Series	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
CONSUMER PRICE INDEX FOR ALL URBAN CONSUMERS:															
All items	109.6	113.6	111.6	112.1	112.7	113.1	113.5	113.8	114.4	115.0	115.3	115.4	115.4	115.7	116.0
All items (1967=100)	328.4	340.4	334.4	335.9	337.7	338.7	340.1	340.8	342.7	344.4	345.3	345.8	345.7	346.7	347.4
Food and beverages	109.1	113.5	112.5	112.5	112.8	113.3	113.8	113.7	113.8	114.2	114.3	114.3	114.8	115.7	115.8
Food	109.0	113.5	112.5	112.5	112.8	113.3	113.8	113.7	113.8	114.1	114.3	114.2	114.7	115.7	115.7
Food at home	107.3	111.9	111.2	110.9	111.3	112.0	112.6	112.1	112.1	112.4	112.4	112.1	112.8	114.1	113.9
Cereals and bakery products	110.9	114.8	113.3	113.4	114.3	114.6	114.7	115.2	115.3	115.4	115.6	116.2	116.8	118.1	118.7
Meats, poultry, fish, and eggs	104.5	110.5	108.8	108.9	108.6	109.6	110.4	111.4	111.9	112.7	112.0	111.2	110.3	111.0	110.6
Dairy products	103.3	105.9	105.9	105.4	105.3	105.7	105.5	105.3	105.7	106.4	106.9	106.9	106.7	107.4	107.3
Fruits and vegetables	109.4	119.1	118.3	117.4	120.1	121.8	124.1	119.6	117.4	117.4	117.8	117.4	123.4	126.4	124.7
Other foods at home	109.4	110.5	111.3	110.8	110.6	110.5	110.2	110.0	110.4	110.3	110.6	110.2	110.0	111.3	111.8
Sugar and sweets	109.0	111.0	110.3	110.7	110.7	110.8	111.2	111.1	111.3	111.6	111.6	111.4	111.0	112.2	112.2
Fats and oils	106.5	108.1	107.4	109.0	108.0	108.5	107.8	108.4	108.3	107.8	107.4	108.0	107.7	108.5	109.5
Nonalcoholic beverages	110.4	107.5	111.3	109.8	108.5	108.0	106.8	105.9	105.9	105.8	106.7	105.0	104.8	106.9	107.7
Other prepared foods	109.2	113.8	112.9	112.6	113.3	113.4	113.7	114.1	114.8	114.6	114.7	115.1	115.0	115.9	116.1
Food away from home	112.5	117.0	115.5	115.9	116.1	116.4	116.8	117.2	117.5	118.0	118.3	118.6	118.9	119.3	119.7
Alcoholic beverages	111.1	114.1	112.8	112.9	113.3	113.6	114.0	114.4	114.7	114.9	115.2	115.4	115.4	115.8	116.8
Housing	110.9	114.2	112.4	112.8	113.2	113.6	114.3	114.7	115.4	115.6	115.5	115.5	115.6	116.2	116.6
Shelter	115.8	121.3	119.0	119.6	120.2	120.5	120.8	121.3	122.2	122.5	123.2	123.4	123.7	124.6	125.0
Renters' costs (12/82=100)	121.9	128.1	125.8	126.4	127.1	127.3	127.9	129.3	130.1	129.8	129.4	129.2	129.1	130.8	131.3
Rent, residential	118.3	123.1	121.7	121.8	122.0	122.3	122.3	123.0	123.8	124.4	124.8	124.8	125.6	126.0	126.3
Other renters' costs	118.6	127.4	122.8	125.0	127.1	127.1	129.1	132.8	133.3	130.5	127.7	126.7	124.1	129.4	130.4
Homeowners' costs (12/82=100)	119.4	124.8	122.5	123.0	123.6	124.0	124.2	124.4	125.4	126.0	127.1	127.4	128.0	128.5	129.0
Owners' equivalent rent (12/82=100)	119.4	124.8	122.5	123.0	123.6	124.1	124.2	124.4	125.4	126.0	127.2	127.5	128.0	128.6	129.0
Household insurance (12/82=100)	119.2	124.0	122.0	122.2	122.4	123.0	123.6	124.5	125.1	125.5	125.8	125.9	126.2	126.9	127.1
Maintenance and repairs	107.9	111.8	110.2	110.7	110.3	110.2	111.1	113.2	112.9	112.7	112.8	113.5	113.3	113.7	114.3
Maintenance and repair services	111.2	114.8	112.5	113.4	112.8	112.3	113.7	116.8	116.5	116.3	116.4	116.9	116.6	117.4	117.9
Maintenance and repair commodities	103.7	107.8	107.2	107.1	107.2	107.5	107.8	108.4	108.2	107.8	108.1	108.9	109.1	108.7	109.5
Fuel and other utilities	104.1	103.0	101.4	101.5	101.3	102.2	104.9	105.0	105.9	105.5	103.2	102.4	102.0	102.4	102.8
Fuels	99.2	97.3	95.3	95.2	94.7	96.1	100.8	100.4	101.4	101.0	96.9	95.5	95.1	95.6	96.0
Fuel oil, coal, and bottled gas	77.6	77.9	77.9	77.5	77.5	77.1	77.2	77.1	77.8	77.6	78.5	80.3	80.5	80.8	80.9
Gas (piped) and electricity	105.7	103.8	101.5	101.5	100.8	102.5	108.1	107.6	108.7	108.2	103.3	101.4	100.9	101.5	101.9
Other utilities and public services	117.9	120.1	119.1	119.3	119.7	119.8	119.4	120.5	121.1	120.8	121.2	121.3	120.9	121.3	121.8
Household furnishings and operations	105.2	107.1	106.5	106.8	107.2	107.1	107.1	107.2	107.3	107.5	107.4	107.4	107.3	107.5	107.7
Housefurnishings	102.2	103.6	103.3	103.6	104.0	103.5	103.5	103.6	103.8	103.9	103.6	103.6	103.3	103.5	103.7
Housekeeping supplies	108.2	111.5	110.1	110.9	111.1	111.7	111.9	111.7	111.5	111.8	112.3	112.4	112.5	113.1	113.2
Housekeeping services	108.5	110.6	109.8	109.9	110.3	110.6	110.5	110.8	110.9	111.0	111.2	111.2	111.4	111.5	111.6
Apparel and upkeep	105.9	110.6	106.2	109.7	111.5	111.1	109.3	107.3	109.4	113.3	115.4	115.4	112.7	110.4	110.2
Apparel commodities	104.2	108.9	104.3	108.1	110.0	109.5	107.6	105.3	107.6	111.8	114.0	114.0	111.0	108.6	108.3
Men's and boys' apparel	106.2	109.1	106.1	108.0	109.2	109.9	109.0	107.8	108.3	110.6	112.0	112.5	110.7	109.0	109.1
Women's and girls' apparel	104.0	110.4	103.9	109.6	112.8	111.2	107.6	104.2	108.4	115.3	118.3	117.7	112.6	108.2	107.8
Infants' and toddlers' apparel	111.8	112.1	108.9	114.3	114.1	113.1	110.1	107.7	109.0	112.1	116.2	116.7	114.5	113.6	111.4
Footwear	101.9	105.1	101.8	104.5	105.8	106.5	105.6	103.4	104.2	105.7	107.3	108.0	107.2	106.1	105.8
Other apparel commodities	101.7	108.0	105.5	106.1	105.9	105.8	107.6	108.2	109.3	110.3	110.7	110.7	111.3	112.9	113.1
Apparel services	115.1	119.6	118.1	118.6	118.6	119.3	119.5	120.0	119.8	119.9	120.8	121.1	121.4	121.6	122.0
Transportation	102.3	105.4	103.1	103.3	104.2	104.7	105.4	106.0	106.5	106.6	107.1	107.8	107.6	107.1	106.8
Private transportation	101.2	104.2	101.8	102.0	103.0	103.5	104.3	104.9	105.4	105.4	106.0	106.8	106.5	106.0	105.7
New vehicles	110.6	114.4	113.5	113.1	113.5	113.8	114.1	114.4	114.0	113.8	115.0	116.3	116.4	116.1	116.0
New cars	110.6	114.6	113.5	113.1	113.6	114.0	114.3	114.7	114.4	114.1	115.2	116.6	116.6	116.2	116.2
Used cars	108.8	113.1	106.9	108.7	111.3	113.4	114.7	115.4	115.5	116.0	116.2	116.5	116.3	116.0	116.0
Motor fuel	77.1	80.2	76.0	76.6	78.5	79.1	80.8	82.2	84.3	84.0	83.2	83.2	82.0	79.7	78.3
Gasoline	77.0	80.1	75.9	76.4	78.4	79.0	80.7	82.1	84.3	84.0	83.1	83.1	81.8	79.5	78.1
Maintenance and repair	110.3	114.8	113.3	113.3	114.3	114.3	114.4	114.5	115.1	115.7	116.1	116.5	116.9	117.2	117.7
Other private transportation	115.1	120.8	118.9	119.1	119.4	119.7	120.3	120.8	120.7	121.1	122.8	123.8	123.8	124.7	125.0
Other private transportation commodities	96.3	96.9	96.4	96.7	96.0	96.7	96.7	96.3	96.8	97.6	98.0	97.6	97.5	98.2	98.1
Other private transportation services	118.8	125.6	123.4	123.5	124.0	124.2	125.0	125.7	125.5	125.8	127.8	129.2	129.2	130.1	130.6
Public transportation	117.0	121.1	120.6	121.1	120.9	120.6	120.2	120.2	121.5	122.1	121.2	122.0	122.1	121.8	120.8
Medical care	122.0	130.1	127.4	128.1	128.7	129.2	129.9	130.7	131.2	131.7	132.3	132.8	133.1	134.4	135.5
Medical care commodities	122.8	131.0	127.4	128.5	129.0	129.9	130.8	131.6	132.2	132.7	133.5	134.2	134.9	135.4	136.1
Medical care services	121.9	130.0	127.4	128.0	128.7	129.0	129.6	130.4	131.0	131.5	132.0	132.5	132.7	134.1	135.3
Professional services	120.8	128.8	125.8	126.6	127.5	127.9	128.8	129.5	130.0	130.7	131.2	131.5	131.8	133.2	134.5
Hospital and related services	123.1	131.6	128.6	129.1	129.7	130.1	130.6	132.0	133.0	133.3	134.2	135.4	135.9	137.6	139.0
Entertainment	111.6	115.3	113.5	113.9	114.5	114.8	114.9	115.4	115.6	116.1	116.9	117.3	117.4	118.1	118.3
Entertainment commodities	107.9	110.5	108.8	109.6	109.9	110.3	110.3	110.7	110.6	110.7	111.2	112.2	112.6	112.9	112.9
Entertainment services	116.8	122.0	120.0	120.1	121.0	121.2	121.4	122.0	122.5	123.5	124.5	124.3	124.3	125.4	125.7
Other goods and services	121.4	128.5	126.1	126.3	126.6	126.9	127.2	128.0	128.5	131.1	131.6	131.8	132.1	133.4	134.2
Tobacco products	124.7	133.6	130.8	131.3	131.6	131.8	132.4	135.0	135.3	135.9	136.3	136.5	137.0	140.8	142.2
Personal care	111.9	115.1	113.9	113.9	114.2	114.9	114.9	115.3	115.6	116.0	116.2	116.3	116.5	117.3	117.8
Toilet goods and personal care appliances	111.3	113.9	112.9	112.9	113.2	113.7	113.7	114.3	114.3	114.7	114.9	115.0	115.0	116.1	116.4
Personal care services	112.5	116.2	114.7	114.8	115.1	116.0	116.1	116.2	116.8	117.2	117.4	117.5	117.9	118.4	119.1
Personal and educational expenses	128.6	138.5	135.6	135.8	136.1	136.3	136.7	136.9	137.7	142.1	142.8	143.1	143.4	143.9	144.7
School books and supplies	128.1	138.1	135.9	136.0	136.2	136.4	136.5	136.5	136.7	141.3	142.3	142.3	142.4	144.6	146.3
Personal and educational services	128.7	138.7	135.8	136.0	136.3	136.5	136.8	137.2	137.9	142.3	143.1	143.4	143.6	144.0	144.8

See footnotes at end of table.

30. Continued— Consumer Price Indexes for All Urban Consumers and for Urban Wage Earners and Clerical Workers: U.S. city average, by expenditure category and commodity or service group

(1982-84=100, unless otherwise indicated)

Series	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
All items	109.6	113.6	111.6	112.1	112.7	113.1	113.5	113.8	114.4	115.0	115.3	115.4	115.4	115.7	116.0
Commodities	104.4	107.7	105.8	106.4	107.2	107.5	107.7	107.6	108.2	108.9	109.3	109.5	109.3	109.2	109.1
Food and beverages	109.1	113.5	112.5	112.5	112.8	113.3	113.8	113.7	113.8	114.2	114.3	114.3	114.8	115.7	115.8
Commodities less food and beverages	101.4	104.0	101.6	102.6	103.6	103.7	103.8	103.8	104.6	105.5	106.1	106.5	105.7	105.1	105.0
Nondurables less food and beverages	97.8	101.1	97.9	99.4	100.7	100.9	100.7	100.6	102.0	103.5	104.2	104.3	103.1	102.1	101.9
Apparel commodities	104.2	108.9	104.3	108.1	110.0	109.5	107.6	105.3	107.6	111.8	114.0	114.0	111.0	108.6	108.3
Nondurables less food, beverages, and apparel	95.9	99.5	96.8	97.3	98.3	98.7	99.6	100.5	101.5	101.6	101.5	101.8	101.5	101.2	101.0
Durables	106.6	108.2	107.0	107.2	107.7	107.9	108.2	108.4	108.3	108.3	108.8	109.6	109.5	109.4	109.4
Services	115.4	120.2	118.1	118.5	118.9	119.3	120.1	120.5	121.2	121.7	121.9	122.0	122.2	122.9	123.4
Rent of shelter (12/82=100)	120.2	125.9	123.6	124.1	124.8	125.1	125.4	126.0	126.9	127.2	128.0	128.1	128.5	129.4	129.8
Household services less rent of' shelter (12/82=100)	112.8	113.1	111.5	111.5	111.4	112.3	114.8	115.1	115.8	115.5	113.5	112.6	112.3	112.7	113.1
Transportation services	116.3	121.9	120.3	120.4	120.9	120.9	121.3	121.7	122.0	122.5	123.4	124.5	124.6	125.1	125.2
Medical care services	121.9	130.0	127.4	128.0	128.7	129.0	129.6	130.4	131.0	131.5	132.0	132.5	132.7	134.1	135.3
Other services	119.4	125.7	123.4	123.7	124.1	124.4	124.7	125.1	125.6	127.9	128.7	128.8	129.0	129.6	130.2
Special indexes:															
All items less food	109.8	113.6	111.4	112.0	112.7	113.0	113.5	113.8	114.5	115.1	115.5	115.7	115.5	115.7	116.0
All items less shelter	108.0	111.6	109.7	110.2	110.8	111.1	111.7	111.8	112.3	113.0	113.2	113.3	113.2	113.3	113.5
All items less homeowners' costs (12/82=100)	111.2	115.1	113.1	113.6	114.2	114.6	115.1	115.3	115.9	116.5	116.6	116.8	116.6	116.9	117.1
All items less medical care	108.8	112.6	110.6	111.1	111.7	112.1	112.5	112.7	113.3	113.9	114.2	114.4	114.3	114.6	114.8
Commodities less food	101.7	104.3	102.0	102.9	103.9	104.0	104.1	104.1	104.9	105.7	106.3	106.7	106.0	105.5	105.4
Nondurables less food	98.5	101.8	98.6	100.1	101.3	101.4	101.4	101.3	102.6	104.0	104.6	104.8	103.7	102.8	102.7
Nondurables less food and apparel	96.9	100.3	97.7	98.2	99.1	99.5	100.3	101.1	102.0	102.2	102.1	102.4	102.1	101.9	101.9
Nondurables	103.5	107.5	105.3	106.1	106.9	107.2	107.4	107.3	108.1	109.0	109.4	109.5	109.1	109.1	109.0
Services less rent of' shelter (12/82=100)	118.7	123.1	121.1	121.3	121.6	122.1	123.2	123.7	124.2	124.9	124.6	124.6	124.6	125.3	125.8
Services less medical care	114.6	119.1	117.0	117.4	117.8	118.2	119.0	119.4	120.1	120.6	120.8	120.8	121.0	121.7	122.1
Energy	88.2	88.6	85.6	85.8	86.4	87.4	90.7	91.1	92.7	92.3	89.8	89.0	88.3	87.4	87.0
All items less energy	112.6	117.2	115.3	115.8	116.4	116.7	116.9	117.1	117.6	118.3	118.9	119.2	119.2	119.7	120.0
All items less food and energy	113.5	118.2	116.1	116.8	117.4	117.6	117.7	118.0	118.6	119.4	120.1	120.5	120.4	120.8	121.1
Commodities less food and energy	108.6	111.8	109.6	110.7	111.5	111.7	111.4	111.2	111.8	112.9	113.7	114.1	113.5	113.2	113.3
Energy commodities	77.2	80.2	76.4	76.9	78.5	79.1	80.6	81.8	83.8	83.5	82.9	83.1	82.0	80.0	78.8
Services less energy	116.5	122.0	119.9	120.3	120.9	121.2	121.4	122.0	122.7	123.2	123.9	124.2	124.4	125.2	125.7
Purchasing power of the consumer dollar:															
1982-84=$1.00	91.3	88.0	89.5	89.1	88.6	88.4	88.0	87.8	87.3	86.9	86.7	86.5	86.6	86.4	86.2
1967=$1.00	30.5	29.4	29.9	29.8	29.6	29.5	29.4	29.3	29.2	29.0	29.0	28.9	28.9	28.8	28.8
CONSUMER PRICE INDEX FOR URBAN WAGE EARNERS AND CLERICAL WORKERS:															
All items	108.6	112.5	110.5	111.0	111.6	111.9	112.4	112.7	113.3	113.8	114.1	114.3	114.2	114.5	114.7
All items (1967=100)	323.4	335.0	329.0	330.5	332.3	333.4	334.9	335.6	337.4	339.1	340.0	340.4	340.2	341.0	341.6
Food and beverages	108.9	113.3	112.3	112.3	112.6	113.1	113.6	113.5	113.6	114.0	114.1	114.1	114.5	115.4	115.5
Food	108.8	113.3	112.3	112.3	112.5	113.1	113.6	113.5	113.6	114.0	114.1	114.0	114.5	115.4	115.4
Food at home	107.1	111.7	110.9	110.7	111.0	111.7	112.3	111.9	111.9	112.2	112.2	111.9	112.5	113.7	113.5
Cereals and bakery products	110.9	114.8	113.3	113.4	114.3	114.5	114.8	115.2	115.3	115.4	115.7	116.2	116.9	118.1	118.8
Meats, poultry, fish, and eggs	104.4	110.4	108.7	108.7	108.5	109.5	110.4	111.3	111.8	112.7	112.0	111.2	110.1	110.8	110.5
Dairy products	103.2	105.7	105.8	105.3	105.1	105.6	105.3	105.1	105.5	106.2	106.7	106.7	106.4	107.1	107.0
Fruits and vegetables	109.4	118.8	117.7	116.9	119.5	121.1	123.9	119.6	117.3	117.1	117.5	117.4	123.0	125.7	124.0
Other foods at home	109.1	110.4	111.0	110.7	110.4	110.4	110.1	109.9	110.3	110.2	110.5	110.1	109.8	111.3	111.7
Sugar and sweets	109.0	110.9	110.1	110.5	110.5	110.7	111.1	111.0	111.3	111.5	111.6	111.2	110.9	112.1	112.1
Fats and oils	106.4	107.9	107.3	108.8	107.9	108.3	107.6	108.2	108.1	107.6	107.3	107.9	107.6	108.4	109.5
Nonalcoholic beverages	110.0	107.5	111.0	109.7	108.4	108.1	106.8	105.9	106.0	106.0	106.9	105.2	104.9	107.2	107.9
Other prepared foods	109.0	113.6	112.6	112.4	113.1	113.2	113.5	113.9	114.6	114.4	114.5	114.9	114.8	115.7	115.8
Food away from home	112.5	116.9	115.5	115.8	116.0	116.2	116.7	117.0	117.4	117.9	118.2	118.5	118.8	119.1	119.6
Alcoholic beverages	111.1	113.9	112.8	112.9	113.2	113.5	113.9	114.2	114.4	114.6	114.9	115.2	115.1	115.6	116.6
Housing	109.7	112.8	111.0	111.4	111.8	112.2	112.9	113.2	114.0	114.1	114.0	113.9	114.1	114.6	115.0
Shelter	113.5	118.8	116.6	117.1	117.7	118.1	118.2	118.8	119.6	120.0	120.7	120.9	121.2	121.9	122.4
Renters' costs (12/84=100)	109.5	114.6	112.7	113.3	113.8	114.0	114.2	115.3	116.0	116.2	116.0	115.9	115.9	116.9	117.3
Rent, residential	118.2	122.9	121.5	121.7	121.9	122.1	122.2	122.8	123.6	124.2	124.5	124.6	125.3	125.7	126.1
Other renters' costs	119.1	128.2	122.4	125.6	128.3	128.6	129.7	133.6	134.2	132.2	129.3	128.1	124.5	129.2	130.0
Homeowners' costs (12/84=100)	108.8	113.8	111.6	112.1	112.7	113.1	113.2	113.4	114.3	114.8	115.9	116.2	116.6	117.1	117.6
Owners' equivalent rent (12/84=100)	108.8	113.7	111.5	112.1	112.7	113.1	113.2	113.4	114.3	114.8	115.9	116.2	116.6	117.1	117.6
Household insurance (12/84=100)	109.4	114.1	112.1	112.4	112.5	113.1	113.8	114.6	115.1	115.5	115.8	115.9	116.1	116.7	116.7
Maintenance and repairs	107.7	111.3	109.9	110.3	110.2	110.2	111.0	112.6	112.4	112.1	112.2	112.7	112.5	113.0	113.6
Maintenance and repair services	110.5	114.7	112.4	113.5	113.2	112.5	113.9	116.9	116.6	116.4	116.0	116.5	115.9	117.1	117.6
Maintenance and repair commodities	103.1	106.0	105.4	105.2	105.2	106.0	106.3	106.3	106.2	105.8	106.3	106.9	107.1	106.9	107.5
Fuel and other utilities	103.9	102.7	101.1	101.2	101.0	101.8	104.6	104.7	105.6	105.2	102.8	102.0	101.7	102.0	102.5
Fuels	99.2	97.1	95.1	95.0	94.4	95.8	100.7	100.2	101.3	100.8	96.5	95.1	94.8	95.2	95.6
Fuel oil, coal, and bottled gas	77.8	77.6	77.7	77.3	77.3	76.8	77.0	76.9	77.5	77.3	78.2	80.1	80.2	80.4	80.6
Gas (piped) and electricity	105.7	103.6	101.3	101.3	100.6	102.2	108.0	107.4	108.6	108.1	103.0	101.1	100.7	101.2	101.6
Other utilities and public services	117.7	120.1	119.0	119.3	119.6	119.7	119.4	120.4	121.0	120.7	121.1	121.2	120.9	121.2	121.8
Household furnishings and operations	105.0	106.7	106.2	106.5	106.9	106.7	106.7	106.8	106.9	107.1	107.0	107.0	106.9	107.1	107.2
Housefurnishings	101.9	103.1	102.8	103.1	103.4	103.0	102.9	103.1	103.3	103.4	103.1	103.1	102.9	103.0	103.1
Housekeeping supplies	108.5	111.8	110.6	111.3	111.5	112.0	112.1	112.1	111.9	112.2	112.7	112.8	112.9	113.5	113.6
Housekeeping services	109.1	110.9	110.3	110.4	110.7	110.9	110.9	111.1	111.2	111.3	111.4	111.4	111.6	111.7	111.8
Apparel and upkeep	105.8	110.4	106.0	109.5	111.4	110.9	109.1	107.1	109.1	112.9	115.2	115.2	112.6	110.3	110.0

See footnotes at end of table.

30. Continued— Consumer Price Indexes for All Urban Consumers and for Urban Wage Earners and Clerical Workers: U.S. city average, by expenditure category and commodity or service group

(1982-84=100, unless otherwise indicated)

Series	Annual average		1987											1988	
	1986	1987	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Apparel commodities	104.2	108.8	104.2	107.9	109.9	109.4	107.4	105.3	107.4	111.5	113.9	113.9	111.1	108.6	108.3
Men's and boys' apparel	105.9	108.5	105.4	107.0	108.3	109.0	108.2	106.9	107.7	109.8	111.5	112.0	110.4	108.6	108.7
Women's and girls' apparel	103.8	110.3	103.7	109.4	113.0	111.4	107.7	104.4	108.2	115.2	118.2	117.6	112.6	108.2	107.9
Infants' and toddlers' apparel	113.5	114.0	111.0	116.2	115.9	115.3	111.7	109.7	110.6	113.9	118.6	118.7	116.4	115.2	113.3
Footwear	102.1	105.5	102.4	105.0	106.1	106.7	105.8	103.9	104.7	106.0	107.9	108.6	108.0	106.8	106.4
Other apparel commodities	101.6	107.4	104.6	105.6	105.5	105.1	107.0	107.3	108.2	109.8	110.4	110.5	110.6	112.2	112.0
Apparel services	115.0	119.2	118.0	118.4	118.4	118.9	119.1	119.5	119.3	119.4	120.3	120.7	120.9	121.1	121.5
Transportation	101.7	105.1	102.5	102.8	103.8	104.4	105.1	105.8	106.3	106.4	106.9	107.6	107.3	106.8	106.4
Private transportation	100.9	104.1	101.5	101.8	102.8	103.4	104.3	104.9	105.5	105.5	106.1	106.7	106.4	105.9	105.6
New vehicles	110.4	114.0	113.2	112.9	113.2	113.5	113.7	113.9	113.5	113.3	114.5	115.9	116.1	115.8	115.7
New cars	110.4	114.3	113.2	112.8	113.3	113.7	114.0	114.4	114.0	113.8	114.9	116.2	116.3	115.9	116.0
Used cars	108.8	113.1	106.9	108.7	111.3	113.4	114.7	115.4	115.5	115.9	116.1	116.4	116.2	115.9	116.0
Motor fuel	77.1	80.3	76.1	76.6	78.5	79.2	80.9	82.3	84.5	84.1	83.3	83.3	82.0	79.7	78.3
Gasoline	76.9	80.2	76.0	76.5	78.5	79.1	80.8	82.2	84.4	84.1	83.2	83.2	81.9	79.5	78.1
Maintenance and repair	110.6	115.1	113.7	113.7	114.6	114.6	114.7	114.9	115.4	116.0	116.3	116.7	117.0	117.4	117.8
Other private transportation	113.8	119.0	117.3	117.4	117.5	117.8	118.5	118.9	118.7	119.1	121.0	122.0	122.0	122.9	123.2
Other private transportation commodities	96.3	96.7	96.4	96.5	95.7	96.4	96.6	96.3	96.7	97.3	97.7	97.2	97.4	98.1	98.0
Other private transportation services	117.1	123.4	121.3	121.4	121.8	122.0	122.8	123.4	123.1	123.4	125.8	127.1	127.1	128.0	128.5
Public transportation	116.8	120.4	119.8	120.2	120.3	120.3	119.7	119.7	120.8	121.4	120.7	121.2	121.3	121.2	120.4
Medical care	122.0	130.2	127.3	128.1	128.8	129.3	130.0	130.8	131.4	132.0	132.6	133.0	133.4	134.6	135.8
Medical care commodities	122.2	130.2	126.8	127.7	128.2	129.1	130.1	130.9	131.3	131.9	132.6	133.4	134.1	134.7	135.4
Medical care services	122.0	130.3	127.4	128.1	128.9	129.3	130.0	130.8	131.4	132.0	132.6	133.0	133.2	134.6	135.8
Professional services	120.9	129.0	125.8	126.7	127.6	128.1	128.9	129.6	130.2	130.9	131.4	131.7	132.0	133.4	134.7
Hospital and related services	122.6	131.1	128.1	128.5	129.1	129.5	130.0	131.4	132.4	132.8	133.7	134.9	135.4	136.9	138.4
Entertainment	111.0	114.8	113.0	113.4	114.0	114.4	114.5	115.0	115.1	115.6	116.3	116.7	116.9	117.4	117.6
Entertainment commodities	107.8	110.6	109.0	109.6	110.0	110.5	110.5	110.9	110.8	110.9	111.3	112.2	112.6	112.8	112.9
Entertainment services	116.5	121.8	119.7	119.8	120.8	121.1	121.2	121.8	122.2	123.2	124.3	124.1	124.0	124.9	125.2
Other goods and services	120.9	127.8	125.4	125.6	125.9	126.2	126.6	127.5	128.0	130.3	130.8	131.0	131.3	132.7	133.6
Tobacco products	124.8	133.7	131.0	131.4	131.7	131.8	132.5	135.1	135.4	136.0	136.5	136.7	137.2	141.0	142.3
Personal care	111.9	115.0	113.9	113.8	114.1	114.7	114.8	115.1	115.4	115.8	116.1	116.2	116.4	117.1	117.5
Toilet goods and personal care appliances	111.2	113.9	113.0	112.8	113.1	113.6	113.6	114.1	114.3	114.6	115.0	115.0	115.1	116.0	116.2
Personal care services	112.6	116.1	114.8	114.8	115.0	115.9	116.0	116.2	116.7	117.1	117.3	117.4	117.8	118.3	118.9
Personal and educational expenses	128.5	138.2	135.3	135.5	135.9	136.1	136.4	136.7	137.4	141.8	142.4	142.8	143.0	143.4	144.3
School books and supplies	127.8	137.9	135.9	136.0	136.2	136.3	136.4	136.4	136.6	140.7	141.8	141.8	141.9	143.9	145.3
Personal and educational services	128.6	138.4	135.5	135.7	136.1	136.3	136.7	137.0	137.7	142.1	142.7	143.1	143.3	143.6	144.5
All items	108.6	112.5	110.5	111.0	111.6	111.9	112.4	112.7	113.3	113.8	114.1	114.3	114.2	114.5	114.7
Commodities	103.9	107.3	105.3	105.9	106.7	107.0	107.3	107.3	107.9	108.5	108.9	109.1	108.9	108.8	108.7
Food and beverages	108.9	113.3	112.3	112.3	112.6	113.1	113.6	113.5	113.6	114.0	114.1	114.1	114.5	115.4	115.5
Commodities less food and beverages	100.8	103.6	101.0	102.0	103.0	103.3	103.4	103.5	104.3	105.1	105.7	106.0	105.4	104.7	104.5
Nondurables less food and beverages	97.3	100.8	97.4	98.9	100.2	100.4	100.4	100.4	101.8	103.1	103.8	104.0	102.8	101.7	101.4
Apparel commodities	104.2	108.8	104.2	107.9	109.9	109.4	107.4	105.3	107.4	111.5	113.9	113.9	111.1	108.6	108.3
Nondurables less food, beverages, and apparel	95.3	99.2	96.4	96.8	97.9	98.4	99.3	100.3	101.4	101.5	101.3	101.6	101.2	100.8	100.5
Durables	104.9	106.6	105.1	105.4	106.0	106.4	106.6	106.9	106.8	106.9	107.4	108.0	108.0	107.9	107.9
Services	114.7	119.4	117.3	117.7	118.1	118.5	119.3	119.7	120.4	120.9	121.1	121.2	121.3	122.0	122.5
Rent of shelter (12/84=100)	109.0	114.0	111.9	112.5	113.0	113.4	113.5	114.0	114.9	115.2	115.9	116.1	116.4	117.1	117.5
Household services less rent of shelter (12/84=100)	103.9	104.0	102.5	102.5	102.4	103.2	105.7	105.9	106.6	106.3	104.2	103.4	103.1	103.5	103.9
Transportation services	115.4	120.8	119.1	119.2	119.7	119.8	120.2	120.6	120.7	121.2	122.5	123.5	123.6	124.1	124.4
Medical care services	122.0	130.3	127.4	128.1	128.9	129.3	130.0	130.8	131.4	132.0	132.6	133.0	133.2	134.6	135.8
Other services	118.7	124.7	122.5	122.7	123.2	123.5	123.7	124.1	124.6	126.9	127.7	127.8	127.9	128.5	129.0
Special indexes:															
All items less food	108.5	112.2	110.0	110.6	111.3	111.6	112.1	112.4	113.1	113.7	114.0	114.3	114.1	114.2	114.4
All items less shelter	107.4	111.0	109.0	109.5	110.1	110.5	111.1	111.2	111.8	112.4	112.6	112.7	112.5	112.7	112.8
All items less homeowners' costs (12/84=100)	102.8	106.4	104.5	104.9	105.5	105.9	106.4	106.6	107.1	107.7	107.8	108.0	107.8	108.0	108.1
All items less medical care	107.8	111.5	109.5	110.0	110.6	111.0	111.5	111.7	112.3	112.9	113.1	113.3	113.2	113.4	113.6
Commodities less food	101.2	103.9	101.4	102.3	103.3	103.6	103.7	103.8	104.6	105.4	105.9	106.3	105.6	105.0	104.9
Nondurables less food	98.0	101.4	98.2	99.6	100.8	101.0	101.0	101.1	102.4	103.6	104.2	104.4	103.3	102.4	102.2
Nondurables less food and apparel	96.4	100.0	97.4	97.8	98.7	99.2	100.0	101.0	101.9	102.0	101.9	102.2	101.8	101.5	101.4
Nondurables	103.3	107.2	105.1	105.8	106.6	106.9	107.2	107.2	107.9	108.8	109.2	109.2	108.8	108.8	108.7
Services less rent of shelter (12/84=100)	107.1	110.8	109.0	109.2	109.5	109.9	111.1	111.5	112.0	112.5	112.2	112.2	112.2	112.8	113.2
Services less medical care	113.9	118.2	116.2	116.5	116.9	117.4	118.1	118.5	119.2	119.7	119.9	119.9	120.1	120.7	121.1
Energy	87.4	88.0	84.9	85.1	85.8	86.8	90.1	90.5	92.2	91.8	89.3	88.6	87.8	86.8	86.3
All items less energy	111.5	116.0	114.1	114.7	115.3	115.6	115.7	115.9	116.4	117.1	117.7	118.0	118.0	118.5	118.7
All items less food and energy	112.3	116.8	114.7	115.3	116.0	116.3	116.3	116.6	117.2	117.9	118.7	119.1	119.0	119.3	119.6
Commodities less food and energy	107.6	110.8	108.5	109.6	110.5	110.7	110.5	110.3	110.8	111.8	112.7	113.1	112.6	112.3	112.4
Energy commodities	77.2	80.3	76.5	76.9	78.6	79.2	80.7	82.0	84.1	83.8	83.0	83.2	82.1	80.0	78.7
Services less energy	115.8	121.2	119.1	119.6	120.1	120.4	120.6	121.1	121.8	122.4	123.1	123.4	123.7	124.3	124.8
Purchasing power of the consumer dollar:															
1982-84=$1.00	92.0	89.0	90.5	90.1	89.6	89.3	88.9	88.7	88.2	87.8	87.6	87.4	87.5	87.3	87.2
1967=$1.00	30.9	29.9	30.4	30.3	30.1	30.0	29.9	29.8	29.6	29.5	29.4	29.4	29.4	29.3	29.3

31. Consumer Price Index: U.S. city average and available local area data: all items

(1982-84=100, unless otherwise indicated)

Area[1]	Pricing schedule[2]	Other index base	All Urban Consumers							Urban Wage Earners						
			1987					1988		1987					1988	
			Feb.	Mar.	Oct.	Nov.	Dec.	Jan.	Feb.	Feb.	Mar.	Oct.	Nov.	Dec.	Jan.	Feb.
U.S. city average	M	-	111.6	112.1	115.3	115.4	115.4	115.7	116.0	110.5	111.0	114.1	114.3	114.2	114.5	114.7
Region and area size[3]																
Northeast urban	M	-	113.6	114.2	118.1	118.3	118.3	118.9	119.2	112.7	113.3	117.1	117.4	117.4	117.9	118.1
Size A - More than 1,200,000	M	-	114.4	114.9	119.2	119.3	119.4	120.0	119.9	112.7	113.2	117.6	117.7	117.8	118.1	118.0
Size B - 500,000 to 1,200,000	M	-	111.3	112.4	115.4	116.1	115.6	116.2	117.0	110.4	111.4	114.3	115.0	114.5	115.1	116.0
Size C - 50,000 to 500,000	M	-	112.9	113.7	115.9	116.0	116.2	117.1	117.2	115.3	116.1	118.6	118.6	118.8	119.6	119.8
North Central urban	M	-	109.7	110.3	113.5	113.5	113.3	113.4	113.7	107.8	108.4	111.6	111.7	111.4	111.5	111.8
Size A - More than 1,200,000	M	-	110.5	111.0	114.2	114.4	113.9	114.1	114.7	108.0	108.5	111.7	111.8	111.4	111.6	112.1
Size B - 360,000 to 1,200,000	M	-	109.6	110.0	113.0	113.0	113.0	113.3	113.5	107.2	107.5	110.7	110.7	110.7	110.9	111.1
Size C - 50,000 to 360,000	M	-	109.0	110.1	113.9	113.9	113.6	113.4	113.4	108.1	109.1	112.8	112.8	112.6	112.4	112.3
Size D - Nonmetropolitan (less than 50,0000	M	-	107.9	108.5	110.5	110.5	110.9	110.6	110.5	107.5	108.0	110.4	110.5	110.7	110.4	110.2
South urban	M	-	110.7	111.1	113.8	114.1	114.0	114.1	114.4	110.1	110.5	113.4	113.6	113.5	113.6	113.8
Size A - More than 1,200,000	M	-	111.2	111.8	114.8	115.2	114.9	114.9	115.2	110.3	110.9	114.1	114.4	114.2	114.1	114.4
Size B - 450,000 to 1,200,000	M	-	111.3	111.7	114.4	114.5	114.5	114.8	115.1	109.5	109.9	112.6	112.7	112.7	112.9	113.0
Size C - 50,000 to 450,000	M	-	110.3	110.5	112.8	113.1	112.8	113.3	113.4	110.6	110.8	113.3	113.5	113.3	113.6	113.8
Size D - Nonmetropolitan (less than 50,000)	M	-	109.2	109.5	112.2	112.6	112.6	112.8	112.7	109.9	110.2	113.0	113.4	113.3	113.5	113.4
West urban	M	-	112.6	113.0	115.9	116.0	116.2	116.7	116.9	111.5	111.9	114.8	114.8	115.0	115.5	115.6
Size A - More than 1,250,000	M	-	113.6	114.1	117.1	117.0	117.2	117.9	118.2	111.3	111.8	114.6	114.5	114.8	115.3	115.6
Size B - 330,000 to 1,250,000	M	-	111.0	111.5	115.0	114.8	115.0	115.8	115.6	111.2	111.7	115.2	115.0	115.2	116.0	115.7
Size C - 50,000 to 330,000	M		112.7	112.9	115.1	115.9	116.0	116.0	115.9	112.0	112.3	114.5	115.3	115.4	115.3	115.3
Size classes:																
A	M	12/86	101.1	101.6	104.6	104.8	104.7	105.0	105.3	100.1	100.6	104.7	104.8	104.7	105.0	105.2
B	M	-	110.9	111.5	114.4	114.6	114.5	115.0	115.2	109.6	110.1	113.1	113.3	113.2	113.6	113.8
C	M	-	110.9	111.4	114.1	114.3	114.2	114.5	114.6	111.1	111.7	114.4	114.7	114.6	114.8	114.9
D	M	-	109.4	109.7	112.3	112.6	112.7	112.9	113.1	109.6	109.9	112.6	113.0	113.1	113.2	113.4
Selected local areas																
Chicago, IL-Northwestern IN	M	-	111.9	112.3	115.1	115.7	115.7	115.3	116.6	108.6	109.0	111.7	112.2	112.2	111.9	112.9
Los Angeles-Long Beach, Anaheim, CA	M	-	114.7	115.5	118.6	118.2	118.5	118.9	119.7	112.1	112.8	115.8	115.4	115.7	115.9	116.6
New York, NY-Northeastern NJ	M	-	115.3	115.8	120.2	120.5	120.6	121.3	121.1	113.8	114.4	118.8	119.1	119.1	119.6	119.3
Philadelphia, PA-NJ	M	-	113.9	114.0	119.1	118.6	118.9	119.3	119.3	113.6	113.8	119.0	118.6	119.0	119.3	119.0
San Francisco-Oakland, CA	M	-	113.4	113.7	117.1	117.3	117.4	118.4	117.9	112.4	112.8	116.0	116.2	116.4	117.5	117.0
Baltimore, MD	1	-	-	112.3	-	115.7	-	116.8	-	-	111.8	-	115.3	-	116.2	-
Boston, MA	1	-	-	115.9	-	119.9	-	120.1	-	-	115.8	-	119.9	-	120.2	-
Cleveland, OH	1	-	-	111.4	-	114.5	-	113.9	-	-	106.7	-	109.9	-	109.3	-
Miami, FL	1	-	-	110.7	-	113.8	-	114.5	-	-	109.9	-	113.1	-	113.8	-
St. Louis, MO-IL	1	-	-	110.7	-	113.1	-	113.4	-	-	110.2	-	112.7	-	113.0	-
Washington, DC-MD-VA	1	-	-	114.5	-	118.5	-	118.3	-	-	113.6	-	117.9	-	117.6	-
Dallas-Ft. Worth, TX	2	-	110.9	-	114.9	-	113.9	-	114.0	110.6	-	114.7	-	113.8	-	113.8
Detroit, MI	2	-	110.2	-	114.1	-	112.6	-	113.7	107.5	-	111.3	-	109.8	-	110.9
Houston, TX	2	-	104.4	-	108.0	-	107.3	-	108.0	104.3	-	108.1	-	107.4	-	108.1
Pittsburgh, PA	2	-	109.8	-	112.8	-	113.0	-	113.3	105.7	-	108.3	-	108.6	-	108.9

[1] Area is the Consolidated Metropolitan Statistical Area (CMSA), exclusive of farms and military. Area definitions are those established by the Office of Management and Budget in 1983, except for Boston-Lawrence-Salem, MA-NH Area (excludes Monroe County); and Milwaukee, WI Area (includes only the Milwaukee MSA). Definitions do not include revisions made since 1983.

[2] Foods, fuels, and several other items priced every month in all areas; most other goods and services priced as indicated:.

M - Every month.

1 - January, March, May, July, September, and November.

2 - February, April, June, August, October, and December.

[3] Regions are defined as the four Census regions.

- Data not available.

NOTE: Local area CPI indexes are byproducts of the national CPI program. Because each local index is a small subset of the national index, it has a smaller sample size and is, therefore, subject to substantially more sampling and other measurement error than the national index. As a result, local area indexes show greater volatility than the national index, although their long-term trends are quite similar. Therefore, the Bureau of Labor Statistics strongly urges users to consider adopting the national average CPI for use in escalator clauses.

32. Annual data: Consumer Price Index, U.S. city average, all items and major groups

(1982-84=100)

Series	1979	1980	1981	1982	1983	1984	1985	1986	1987
Consumer Price Index for All Urban Consumers:									
All items:									
Index	72.6	82.4	90.9	96.5	99.6	103.9	107.6	109.6	113.6
Percent change	11.3	13.5	10.3	6.2	3.2	4.3	3.6	1.9	3.6
Food and beverages:									
Index	79.9	86.7	93.5	97.3	99.5	103.2	105.6	109.1	113.5
Percent change	10.7	8.5	7.8	4.1	2.3	3.7	2.3	3.3	4.0
Housing:									
Index	70.1	81.1	90.4	96.9	99.5	103.6	107.7	110.9	114.2
Percent change	12.3	15.7	11.5	7.2	2.7	4.1	4.0	3.0	3.0
Apparel and upkeep:									
Index	84.9	90.9	95.3	97.8	100.2	102.1	105.0	105.9	110.6
Percent change	4.3	7.1	4.8	2.6	2.5	1.9	2.8	.9	4.4
Transportation:									
Index	70.5	83.1	93.2	97.0	99.3	103.7	106.4	102.3	105.4
Percent change	14.3	17.9	12.2	4.1	2.4	4.4	2.6	-3.9	3.0
Medical care:									
Index	67.5	74.9	82.9	92.5	100.6	106.8	113.5	122.0	130.1
Percent change	9.2	11.0	10.7	11.6	8.8	6.2	6.3	7.5	6.6
Entertainment:									
Index	76.7	83.6	90.1	96.0	100.1	103.8	107.9	111.6	115.3
Percent change	6.7	9.0	7.8	6.5	4.3	3.7	3.9	3.4	3.3
Other goods and services:									
Index	68.9	75.2	82.6	91.1	101.1	107.9	114.5	121.4	128.5
Percent change	7.2	9.1	9.8	10.3	11.0	6.7	6.1	6.0	5.8
Consumer Price Index for Urban Wage Earners and Clerical Workers:									
All items:									
Index	73.1	82.9	91.4	96.9	99.8	103.3	106.9	108.6	112.5
Percent change	11.4	13.4	10.3	6.0	3.0	3.5	3.5	1.6	3.6

33. Producer Price Indexes, by stage of processing

(1982=100)

Grouping	Annual average		1987										1988	
	1986	1987	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Finished goods	103.2	105.4	104.3	105.1	105.4	105.5	106.0	105.9	105.7	106.2	106.2	105.7	106.2	105.9
Finished consumer goods	101.4	103.6	102.3	103.2	103.7	103.9	104.4	104.3	104.2	104.4	104.5	103.9	104.3	104.0
Finished consumer foods	107.3	109.5	108.1	109.2	110.6	110.6	110.9	109.5	110.5	109.7	109.9	108.8	110.6	109.4
Finished consumer goods excluding foods	98.5	100.7	99.5	100.3	100.3	100.6	101.2	101.8	101.1	101.9	101.8	101.4	101.3	101.3
Nondurable goods less food	93.3	94.8	93.6	94.3	94.4	94.8	95.7	96.6	96.1	95.8	95.8	95.6	95.3	95.4
Durable goods	108.9	111.5	110.5	111.4	111.2	111.2	111.3	110.9	110.0	113.4	112.9	112.2	112.5	112.5
Capital equipment	109.7	111.7	111.1	111.6	111.6	111.4	111.6	111.7	111.2	112.5	112.5	112.4	112.7	112.9
Intermediate materials, supplies, and components	99.1	101.5	99.6	100.2	100.9	101.5	102.1	102.5	102.7	103.1	103.5	103.7	104.2	104.1
Materials and components for manufacturing	102.2	105.3	103.4	104.0	104.6	105.1	105.5	105.8	106.3	107.2	107.6	108.2	109.3	109.5
Materials for food manufacturing	98.4	100.8	98.2	100.1	102.7	102.3	102.7	101.5	102.8	101.9	100.3	99.8	102.0	101.9
Materials for nondurable manufacturing	98.1	102.3	99.8	100.9	101.3	102.5	102.6	102.9	103.4	104.5	105.2	105.4	107.0	107.6
Materials for durable manufacturing	101.2	106.2	102.5	103.3	104.5	104.9	106.2	107.1	108.1	110.2	110.9	112.9	114.4	113.9
Components for manufacturing	107.5	108.8	108.4	108.4	108.5	108.5	108.7	108.8	109.0	109.3	109.6	109.8	110.3	110.7
Materials and components for construction	108.1	109.8	108.5	108.7	108.9	109.3	109.8	110.2	110.7	111.2	111.8	112.5	113.5	113.7
Processed fuels and lubricants	72.7	73.3	70.3	71.2	72.5	74.5	76.0	77.3	75.9	74.6	74.9	73.3	71.2	70.2
Containers	110.3	114.5	113.8	114.0	114.0	114.2	114.2	114.4	115.4	116.1	116.3	116.1	116.7	116.9
Supplies	105.6	107.7	106.4	106.7	107.3	107.6	107.8	107.8	108.2	108.8	109.4	110.1	110.6	110.5
Crude materials for further processing	87.7	93.7	90.3	92.4	94.8	95.1	96.0	96.5	95.7	95.3	94.6	94.3	93.4	94.6
Foodstuffs and feedstuffs	93.2	96.2	92.7	96.9	101.6	99.7	98.4	97.1	96.6	96.1	95.2	95.8	96.9	99.6
Crude nonfood materials	81.6	87.9	84.8	85.5	86.4	88.0	90.3	91.8	90.8	90.5	90.0	89.1	87.1	87.3
Special groupings														
Finished goods, excluding foods	101.9	104.0	103.0	103.7	103.7	103.9	104.3	104.7	104.2	105.1	105.0	104.7	104.7	104.8
Finished energy goods	63.0	61.8	60.2	61.7	61.6	62.5	63.4	64.9	63.4	62.4	62.4	60.9	59.0	58.4
Finished goods less energy	109.7	112.3	111.3	112.0	112.4	112.3	112.7	112.3	112.4	113.1	113.2	112.9	113.8	113.6
Finished consumer goods less energy	109.7	112.5	111.3	112.1	112.6	112.7	113.1	112.6	112.8	113.4	113.4	113.1	114.2	113.9
Finished goods less food and energy	110.6	113.3	112.5	112.9	113.0	112.9	113.3	113.4	113.1	114.5	114.4	114.5	115.0	115.3
Finished consumer goods less food and energy	111.1	114.2	113.2	113.7	113.7	113.7	114.2	114.3	114.1	115.6	115.5	115.6	116.3	116.7
Consumer nondurable goods less food and energy	113.1	116.3	115.3	115.5	115.6	115.7	116.5	116.9	117.3	117.4	117.5	118.3	119.2	119.8
Intermediate materials less foods and feeds	99.3	101.7	99.9	100.4	100.9	101.6	102.2	102.7	102.8	103.2	103.7	103.8	104.2	104.2
Intermediate foods and feeds	96.2	99.2	95.1	96.9	100.4	100.7	100.7	99.6	101.0	100.6	101.1	101.9	103.1	101.7
Intermediate energy goods	72.6	73.1	70.1	71.0	72.2	74.1	75.7	77.0	75.6	74.4	74.6	73.0	70.9	70.0
Intermediate goods less energy	104.5	107.3	105.6	106.1	106.7	107.1	107.4	107.7	108.3	109.1	109.4	110.0	110.9	111.1
Intermediate materials less foods and energy	104.9	107.8	106.2	106.6	107.0	107.5	107.9	108.2	108.7	109.6	110.1	110.7	111.7	111.9
Crude energy materials	71.8	75.0	73.6	74.1	74.5	75.6	77.8	78.9	76.7	75.4	74.6	73.5	70.7	70.5
Crude materials less energy	95.4	100.8	95.9	99.4	103.5	102.8	102.4	102.3	103.0	103.6	103.0	103.5	104.8	107.2
Crude nonfood materials less energy	103.1	115.6	106.8	108.1	110.5	113.5	115.7	118.7	122.9	126.4	126.7	127.0	128.6	130.6

34. Producer Price indexes, by durability of product

(1982=100)

Grouping	Annual average		1987										1988	
	1986	1987	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Total durable goods	107.5	109.9	108.7	109.1	109.2	109.3	109.7	110.0	110.2	111.4	111.7	112.0	112.6	112.8
Total nondurable goods	94.8	97.5	95.5	96.5	97.6	98.2	98.8	99.0	98.8	98.5	98.6	98.3	98.5	98.5
Total manufactures	101.7	104.4	102.8	103.5	104.0	104.3	104.8	105.1	105.1	105.8	106.0	105.9	106.5	106.5
Durable	107.5	109.6	108.7	109.0	109.1	109.1	109.4	109.7	109.7	110.9	111.1	111.5	112.0	112.1
Nondurable	96.0	99.2	96.9	98.1	98.9	99.5	100.1	100.5	100.4	100.7	100.9	100.5	101.0	101.0
Total raw or slightly processed goods	92.3	94.2	92.4	93.1	94.8	95.4	96.2	96.2	95.9	94.9	94.7	94.5	94.1	94.2
Durable	107.8	122.5	111.7	112.1	114.6	118.6	121.8	125.7	130.9	137.3	137.8	137.8	139.5	143.4
Nondurable	91.5	92.9	91.4	92.2	93.8	94.2	95.0	94.7	94.3	92.9	92.7	92.4	92.0	91.9

35. Annual data: Producer Price Indexes, by stage of processing

(1982=100)

Index	1978	1979	1980	1981	1982	1983	1984	1985	1986
Finished goods:									
Total	69.8	77.6	88.0	96.1	100.0	101.6	103.7	104.7	103.2
Consumer goods	69.4	77.5	88.6	96.6	100.0	101.3	103.3	103.8	101.4
Capital equipment	71.3	77.5	85.8	94.6	100.0	102.8	105.2	107.5	109.7
Intermediate materials, supplies, and components:									
Total	69.5	78.4	90.3	98.6	100.0	100.6	103.1	102.7	99.1
Materials and components for manufacturing	72.0	80.9	91.7	98.7	100.0	101.2	104.1	103.3	102.2
Materials and components for construction	76.5	84.2	91.3	97.9	100.0	102.8	105.6	107.3	108.1
Processed fuels and lubricants	49.9	61.6	85.0	100.6	100.0	95.4	95.7	92.8	72.7
Containers	71.0	79.4	89.1	96.7	100.0	100.4	105.9	109.0	110.3
Supplies	72.9	80.2	89.9	96.9	100.0	101.8	104.1	104.4	105.6
Crude materials for further processing:									
Total	73.4	85.9	95.3	103.0	100.0	101.3	103.5	95.8	87.7
Foodstuffs and feedstuffs	87.3	100.0	104.6	103.9	100.0	101.8	104.7	94.8	93.2
Nonfood materials except fuel	57.5	69.6	84.6	101.8	100.0	100.7	102.2	96.9	81.6
Fuel	48.2	57.3	69.4	84.8	100.0	105.1	105.1	102.7	92.2

36. U.S. export price indexes by Standard International Trade Classification

(June 1977=100, unless otherwise indicated)

Category	1974 SITC	1985			1986				1987			
		June	Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
ALL COMMODITIES (9/83=100)		97.5	96.5	96.7	97.0	96.7	95.1	96.2	97.2	99.9	100.2	102.8
Food (3/83=100)	0	94.0	90.2	93.6	90.5	89.5	77.2	81.2	79.8	83.4	79.6	88.5
Meat (3/83=100)	01	104.7	106.1	112.2	111.5	114.7	122.0	122.6	123.4	129.0	127.9	117.8
Fish (3/83=100)	03	103.6	102.6	101.8	102.2	106.2	111.2	116.9	118.5	122.9	126.3	135.4
Grain and grain preparations (3/80=100)	04	90.3	82.6	87.1	82.1	79.1	59.0	64.8	62.9	66.5	62.1	72.3
Vegetables and fruit (3/83=100)	05	120.2	126.9	118.9	115.3	125.8	131.4	131.9	130.8	130.8	124.4	125.4
Feedstuffs for animals (3/83=100)	08	68.6	75.7	83.4	88.5	85.5	90.2	87.4	85.7	93.7	92.4	111.5
Misc. food products (3/83=100)	09	109.2	108.1	107.7	106.0	104.7	106.6	108.2	108.6	110.0	109.4	109.3
Beverages and tobacco (6/83=100)	1	100.1	99.7	98.6	95.6	96.5	96.3	101.6	101.7	104.0	104.4	105.7
Beverages (9/83=100)	11	105.3	101.8	100.9	101.9	103.0	102.2	102.9	104.7	104.8	104.4	105.6
Tobacco and tobacco products (6/83=100)	12	99.6	99.5	98.4	95.1	95.9	95.8	101.4	101.4	104.0	104.5	105.7
Crude materials (6/83=100)	2	96.8	93.3	92.5	95.8	95.6	92.3	94.8	97.1	106.3	109.1	114.4
Raw hides and skins (6/80=100)	21	126.2	129.0	139.9	138.9	148.9	138.0	148.3	168.8	191.2	189.1	200.3
Oilseeds and oleaginous fruit (9/77=100)	22	71.2	64.2	63.9	66.9	65.8	64.5	62.9	60.4	68.6	64.3	73.6
Crude rubber (including synthetic and reclaimed) (9/83=100)	23	106.3	107.1	106.0	106.0	106.1	105.3	104.4	106.2	107.5	109.0	112.9
Wood	24	125.7	124.5	128.1	128.7	128.7	129.7	135.5	139.0	146.2	174.0	179.9
Pulp and waste paper (6/83=100)	25	96.1	93.8	92.7	98.8	109.7	119.8	121.2	133.0	138.7	142.6	146.6
Textile fibers	26	105.8	103.6	97.7	101.6	98.6	74.7	92.2	99.7	115.0	119.2	114.4
Crude fertilizers and minerals	27	167.9	169.4	165.5	168.0	166.1	164.3	162.8	155.6	155.1	149.8	149.8
Metalliferous ores and metal scrap	28	82.0	80.1	78.7	83.4	80.5	84.6	80.7	82.2	90.7	99.7	103.8
Mineral fuels	3	99.2	97.6	96.6	91.9	86.7	85.7	84.7	85.6	84.4	85.6	84.7
Animal and vegetables oils, fats, and waxes	4	144.5	114.5	101.4	90.8	84.4	76.5	86.8	88.9	94.5	94.1	98.4
Fixed vegetable oils and fats (6/83=100)	42	164.8	128.8	108.7	95.4	95.3	80.8	87.0	89.1	94.7	94.3	100.4
Chemicals (3/83=100)	5	96.8	97.1	96.6	96.5	95.4	93.1	92.2	96.6	103.1	104.1	108.6
Organic chemicals (12/83=100)	51	96.5	97.1	95.4	93.5	89.3	88.0	89.4	99.5	114.3	111.1	115.8
Fertilizers, manufactured (3/83=100)	56	87.9	89.8	90.0	88.6	84.0	77.4	68.7	75.4	80.4	88.0	93.9
Intermediate manufactured products (9/81=100)	6	99.2	99.2	99.1	100.3	101.2	102.2	102.7	104.4	106.8	108.5	109.6
Leather and furskins (9/79=100)	61	79.2	75.9	78.5	77.8	82.5	84.2	88.0	96.3	101.1	99.7	97.2
Rubber manufactures	62	149.0	148.3	148.7	151.0	150.0	150.4	151.3	152.1	153.9	155.2	155.6
Paper and paperboard products (6/78=100)	64	151.6	149.6	148.2	152.2	158.7	165.3	167.9	174.4	177.7	182.3	184.6
Iron and steel (3/82=100)	67	95.3	95.9	98.2	98.4	99.4	100.2	100.1	101.5	101.5	102.4	104.5
Nonferrous metals (9/81=100)	68	79.6	79.8	78.2	80.2	79.1	79.4	78.8	80.3	90.1	94.6	95.3
Metal manufactures, n.e.s. (3/82=100)	69	105.2	105.4	104.4	105.3	105.5	105.6	105.7	105.7	105.6	106.2	106.7
Machinery and transport equipment, excluding military and commercial aircraft (12/78=100)	7	142.9	143.1	143.3	144.0	144.2	144.6	145.5	146.2	146.7	147.2	148.0
Power generating machinery and equipment (12/78=100)	71	167.4	167.1	167.5	169.1	169.2	169.5	171.4	173.0	171.7	173.4	174.3
Machinery specialized for particular industries (9/78=100)	72	155.7	156.0	156.2	155.5	154.7	155.0	155.7	154.7	155.9	156.5	157.1
Metalworking machinery (6/78=100)	73	155.1	156.3	158.4	159.0	158.9	160.4	161.8	165.0	165.8	167.8	168.3
General industrial machines and parts n.e.s. 9/78=100)	74	152.0	152.4	152.2	152.3	153.3	154.4	155.3	157.7	157.8	157.9	159.3
Office machines and automatic data processing equipment	75	100.0	99.9	99.4	99.9	99.2	98.9	98.1	96.1	96.0	95.5	95.4
Telecommunications, sound recording and reproducing equipment	76	133.3	134.1	134.5	136.5	137.0	137.8	139.7	141.3	140.8	141.2	142.1
Electrical machinery and equipment	77	116.1	115.3	113.8	115.1	114.2	114.4	114.9	117.0	117.4	117.6	119.1
Road vehicles and parts (3/80=100)	78	133.9	133.8	135.0	135.5	136.4	136.5	137.9	138.0	138.5	138.9	139.1
Other transport equipment, excl. military and commercial aviation	79	196.6	199.3	200.7	203.3	206.8	207.4	209.7	211.4	214.7	215.7	218.7
Other manufactured articles	8	100.4	100.3	100.3	102.6	103.4	104.1	104.3	105.3	107.3	107.7	108.4
Apparel (9/83=100)	84	104.7	105.0	105.3	–	–	–	110.0	–	–	–	–
Professional, scientific, and controlling instruments and apparatus	87	178.3	178.7	178.8	182.1	183.8	183.8	184.8	186.4	188.5	190.2	191.9
Photographic apparatus and supplies, optical goods, watches and clocks (12/77=100)	88	129.1	127.5	128.5	131.6	132.9	132.7	132.0	133.4	133.1	129.5	128.2
Miscellaneous manufactured articles, n.e.s.	89	93.1	93.1	92.4	95.6	95.6	97.6	97.7	98.1	102.1	103.0	103.8
Gold, non-monetary (6/83=100)	971	75.4	77.4	77.5	81.8	82.2	97.5	94.5	98.2	108.4	110.0	117.1

– Data not available.

37. U.S. import price indexes by Standard International Trade Classification

(June 1977=100, unless otherwise indicated)

Category	1974 SITC	1985	1986				1987			
		Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
ALL COMMODITIES (9/82=100)		94.2	88.5	83.2	83.9	86.0	91.6	95.3	96.8	98.7
Food (9/77=100)	0	102.8	113.4	104.7	109.1	105.3	100.2	102.0	102.8	105.5
Meat	01	131.2	122.7	118.5	126.9	134.4	132.1	135.9	142.9	142.0
Dairy products and eggs (6/81=100)	02	100.5	106.7	107.1	109.4	111.5	116.8	119.6	118.9	122.3
Fish	03	132.7	139.3	144.8	149.6	157.1	161.6	167.4	174.4	175.2
Bakery goods, pasta products, grain and grain preparations (9/77=100)	04	141.9	146.9	149.2	154.0	155.3	161.0	165.2	161.2	168.3
Fruits and vegetables	05	131.3	119.4	119.4	127.1	125.5	120.5	125.4	124.5	131.2
Sugar, sugar preparations, and honey (3/82=100)	06	111.9	124.6	121.6	123.9	124.3	126.0	128.6	128.0	125.3
Coffee, tea, cocoa	07	64.6	85.9	69.2	71.8	61.0	50.9	49.3	48.3	51.5
Beverages and tobacco	1	162.1	163.2	165.5	165.8	168.0	170.8	174.1	174.4	175.9
Beverages	11	159.1	161.8	163.9	165.5	168.2	171.5	174.6	175.6	177.8
Crude materials	2	91.2	94.2	95.3	98.1	98.5	103.1	105.6	108.6	112.7
Crude rubber (inc. synthetic & reclaimed) (3/84=100)	23	73.2	78.8	75.5	76.9	78.5	79.1	84.5	89.4	97.8
Wood (9/81=100)	24	99.4	104.3	106.3	109.4	107.2	115.0	112.0	119.2	111.2
Pulp and waste paper (12/81=100)	25	75.8	74.9	79.9	86.0	92.8	100.5	104.6	105.9	111.9
Crude fertilizers and crude minerals (12/83=100)	27	102.1	101.5	100.0	100.4	100.2	99.5	98.5	97.3	98.7
Metalliferous ores and metal scrap (3/84=100)	28	90.1	94.5	95.6	98.2	95.4	98.0	100.0	102.9	113.3
Crude vegetable and animal materials, n.e.s.	29	102.5	103.6	104.4	104.8	104.7	113.4	120.3	113.6	118.5
Fuels and related products (6/82=100)	3	79.1	55.3	37.5	33.6	38.4	49.7	54.8	56.4	55.2
Petroleum and petroleum products (6/82=100)	33	80.1	54.7	36.1	32.1	37.9	49.9	55.2	57.3	56.2
Fats and oils (9/83=100)	4	50.6	41.4	39.3	35.5	51.6	50.8	54.5	61.3	64.5
Vegetable oils (9/83=100)	42	48.9	39.3	37.4	33.5	50.0	49.2	52.6	59.4	62.5
Chemicals (9/82=100)	5	94.2	94.6	93.3	93.4	93.2	95.9	98.7	99.5	104.4
Medicinal and pharmaceutical products (3/84=100)	54	96.7	102.9	104.9	110.0	110.1	116.2	120.3	118.8	123.3
Manufactured fertilizers (3/84=100)	56	78.5	79.2	79.7	77.4	79.7	81.8	83.6	98.8	124.2
Chemical materials and products, n.e.s. (9/84=100)	59	97.8	99.9	100.3	101.0	102.8	104.3	105.0	108.2	110.1
Intermediate manufactured products (12/77=100)	6	133.4	134.0	135.6	138.8	139.4	142.2	147.4	152.8	157.9
Leather and furskins	61	141.3	141.6	143.0	147.4	143.3	149.5	156.6	159.6	167.5
Rubber manufactures, n.e.s.	62	138.1	136.5	137.7	138.1	138.1	140.8	140.5	138.0	139.8
Cork and wood manufactures	63	124.0	130.8	134.3	137.4	142.7	144.3	151.6	156.3	157.6
Paper and paperboard products	64	156.5	157.1	157.1	157.5	164.8	165.2	165.0	174.6	177.7
Textiles	65	128.1	131.2	132.9	135.1	135.3	138.8	140.4	142.8	147.6
Nonmetallic mineral manufactures, n.e.s.	66	162.2	164.2	169.6	178.2	180.2	183.1	190.3	195.1	199.3
Iron and steel (9/78=100)	67	118.3	117.3	118.1	119.0	118.5	122.3	127.1	132.1	138.9
Nonferrous metals (12/81=100)	68	80.4	79.4	78.9	83.5	81.6	82.4	90.9	97.5	101.9
Metal manufactures, n.e.s.	69	121.6	124.4	127.8	129.1	129.1	133.4	134.5	136.0	139.4
Machinery and transport equipment (6/81=100)	7	107.2	111.5	115.3	118.1	120.2	123.9	126.1	126.4	129.4
Machinery specialized for particular industries (9/78=100)	72	104.9	112.1	115.4	120.1	121.0	127.5	130.0	130.0	136.9
Metalworking machinery (3/80=100)	73	98.1	105.0	107.7	110.7	115.7	122.4	126.1	129.8	135.0
General industrial machinery and parts, n.e.s. (6/81=100)	74	98.0	103.8	109.0	112.8	113.9	120.5	123.3	122.4	128.7
Office machines and automatic data processing equipment (3/80=100)	75	93.7	96.9	101.3	102.5	102.4	103.2	106.4	106.8	109.1
Telecommunications, sound recording and reproducing apparatus (3/80=100)	76	88.6	89.4	91.6	93.7	93.9	94.6	95.5	95.9	97.3
Electrical machinery and equipment (12/81=100)	77	83.1	84.5	87.5	89.5	91.7	93.6	94.8	94.2	96.5
Road vehicles and parts (6/81=100)	78	117.8	123.4	127.1	129.8	133.2	137.0	139.2	139.6	141.7
Misc. manufactured articles (3/80=100)	8	100.8	103.3	104.8	109.5	109.6	114.3	118.1	119.8	123.8
Plumbing, heating, and lighting fixtures (6/80=100)	81	115.0	120.1	123.5	125.5	125.5	125.5	130.6	131.1	137.5
Furniture and parts (6/80=100)	82	142.7	147.0	142.2	145.8	146.9	148.9	153.3	156.1	161.2
Clothing (9/77=100)	84	134.5	133.4	135.3	137.8	139.1	145.5	150.9	153.8	154.5
Footwear	85	142.7	147.0	142.2	145.8	146.9	148.9	153.3	156.1	161.2
Professional, scientific, and controlling instruments and apparatus (12/79=100)	87	102.4	106.4	112.5	118.3	118.0	125.6	129.5	127.0	132.4
Photographic apparatus and supplies, optical goods, watches, and clocks (3/80=100)	88	94.5	99.3	103.2	106.9	107.6	111.8	114.4	113.2	116.9
Misc. manufactured articles, n.e.s. (6/82=100)	89	97.9	102.1	103.4	112.3	111.0	116.9	121.8	124.6	132.2
Gold, non-monetary (6/82=100)	971	101.0	106.7	107.3	126.9	123.3	128.0	141.5	143.5	152.8

38. U.S. export price indexes by end-use category

(September 1983 = 100 unless otherwise indicated)

Category	Percentage of 1980 trade value	1985	1986				1987			
		Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Foods, feeds, and beverages	16.294	77.5	75.5	74.7	66.0	68.4	67.1	71.3	68.0	75.6
Raw materials	30.696	95.9	96.0	94.9	93.3	94.8	98.2	103.1	105.9	108.1
Raw materials, nondurable	21.327	97.9	97.5	96.1	93.7	95.4	99.4	104.7	106.1	108.4
Raw materials, durable	9.368	91.0	92.5	91.9	92.5	93.2	95.1	99.2	105.3	107.3
Capital goods (12/82=100)	30.186	106.6	107.4	107.5	107.7	108.3	108.9	109.4	109.8	110.7
Automotive vehicles, parts and engines (12/82=100)	7.483	109.2	109.5	110.4	110.8	111.8	111.9	112.1	112.5	112.6
Consumer goods	7.467	101.4	103.7	104.5	104.5	105.7	106.9	107.1	107.5	108.1
Durables	3.965	99.5	101.8	101.8	102.1	102.7	103.9	103.6	104.3	105.3
Nondurables	3.501	103.3	105.5	107.2	106.9	108.5	109.8	110.5	110.5	110.9

39. U.S. import price indexes by end-use category

(December 1982=100)

Category	Percentage of 1980 trade value	1985	1986				1987			
		Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Foods, feeds, and beverages	7.477	106.0	115.8	108.2	112.3	109.2	104.7	106.6	107.5	109.9
Petroleum and petroleum products, excl. natural gas	31.108	80.5	55.4	36.8	32.6	38.3	50.5	55.8	57.9	56.8
Raw materials, excluding petroleum	19.205	93.9	94.5	94.0	95.3	94.9	96.9	100.5	103.5	106.7
Raw materials, nondurable	9.391	91.8	91.1	89.7	89.5	89.7	91.8	94.5	95.4	97.9
Raw materials, durable	9.814	96.2	98.1	98.7	101.4	100.3	102.3	106.8	112.0	116.1
Capital goods	13.164	100.0	102.8	106.7	109.4	110.7	115.3	117.9	118.2	122.3
Automotive vehicles, parts and engines	11.750	111.4	115.6	119.0	121.0	123.9	126.2	128.0	127.9	129.7
Consumer goods	14.250	102.4	104.5	106.5	110.1	110.6	114.3	117.5	119.1	122.1
Durable	5.507	100.7	103.4	106.5	111.2	111.6	114.8	117.5	119.0	122.2
Nondurable	8.743	104.7	106.0	106.6	108.6	109.2	113.7	117.6	119.3	121.9

40. U.S. export price indexes by Standard Industrial Classification [1]

Industry group	1985	1986				1987			
	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Manufacturing:									
Food and kindred products (6/83=100)	98.1	97.0	95.0	95.2	97.6	99.0	104.1	103.6	113.4
Lumber and wood products, except furniture (6/83=100)	101.2	101.5	101.2	102.1	105.7	109.8	113.0	133.1	137.2
Furniture and fixtures (9/83=100)	108.4	109.2	109.7	110.1	110.4	113.4	114.0	114.1	116.9
Paper and allied products (3/81=100)	92.1	95.7	101.5	106.1	108.7	113.7	116.7	120.3	123.2
Chemicals and allied products (12/84=100)	99.2	98.9	98.3	96.2	95.9	100.1	106.3	107.6	112.6
Petroleum and coal products (12/83=100)	99.1	93.5	83.1	83.1	82.2	83.5	86.8	87.1	85.8
Primary metal products (3/82=100)	87.9	89.8	89.8	90.7	89.9	91.7	97.4	100.1	101.0
Machinery, except electrical (9/78=100)	140.5	140.6	140.3	140.5	140.7	141.0	141.2	141.4	142.0
Electrical machinery (12/80=100)	111.2	112.6	112.3	112.6	113.6	115.2	115.3	115.8	116.8
Transportation equipment (12/78=100)	164.1	165.1	167.1	167.4	169.4	170.0	171.2	172.3	173.9
Scientific instruments; optical goods; clocks (6/77=100)	156.7	159.7	161.2	161.5	162.3	163.3	164.6	164.7	165.4

[1] SIC - based classification.

41. U.S. import price indexes by Standard Industrial Classification [1]

Industry group	1985	1986				1987			
	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Manufacturing:									
Food and kindred products (6/77=100)	115.1	117.7	115.6	118.0	122.4	122.7	125.9	128.5	129.8
Textile mill products (9/82=100)	101.8	104.7	106.4	107.1	108.0	111.7	113.6	116.2	120.8
Apparel and related products (6/77=100)	134.4	133.4	135.1	137.8	139.3	146.0	150.9	153.9	154.5
Lumber and wood products, except furniture (6/77=100)	115.8	122.1	124.8	127.9	127.9	134.5	135.0	141.3	136.3
Furniture and fixtures (6/80=100)	98.2	101.2	103.5	105.4	105.6	109.6	110.2	111.5	113.1
Paper and allied products (6/77=100)	137.4	137.6	139.4	142.2	150.3	154.0	155.7	162.9	167.6
Chemicals and allied products (9/82=100)	95.8	98.6	102.1	103.8	102.4	104.7	105.7	106.1	110.8
Rubber and miscellaneous plastic products (12/80=100)	97.5	100.9	100.6	101.9	102.1	104.4	105.8	104.9	108.8
Leather and leather products	144.0	145.8	144.6	147.7	148.7	151.8	156.2	159.8	164.0
Primary metal products (6/81=100)	82.6	82.0	82.4	84.9	84.0	85.4	91.3	96.0	100.3
Fabricated metal products (12/84=100)	102.6	104.9	108.5	110.3	111.1	115.5	116.2	118.1	119.9
Machinery, except electrical (3/80=100)	100.0	105.5	109.0	112.5	114.2	119.1	122.2	122.6	128.1
Electrical machinery (9/84=100)	95.8	97.0	100.2	102.6	104.0	105.7	106.9	106.6	108.7
Transportation equipment (6/81=100)	119.6	123.9	128.0	130.4	133.2	136.5	138.4	138.7	141.2
Scientific instruments; optical goods; clocks (12/79=100)	98.8	103.9	109.1	113.7	113.7	119.1	122.1	120.4	124.6
Miscellaneous manufactured commodities (9/82=100)	98.7	99.9	101.7	106.9	108.1	110.3	113.8	116.4	118.8

[1] SIC - based classification.

42. Indexes of productivity, hourly compensation, and unit costs, quarterly data seasonally adjusted

(1977=100)

Item	Quarterly Indexes										
	1985			1986				1987			
	II	III	IV	I	II	III	IV	I	II	III	IV
Business:											
Output per hour of all persons	107.2	108.2	107.9	109.5	109.7	109.6	109.6	109.7	110.1	111.3	111.1
Compensation per hour	174.6	177.0	179.3	180.7	182.2	183.6	185.2	185.8	187.3	189.1	190.5
Real compensation per hour	98.6	99.4	99.7	100.1	101.3	101.4	101.6	100.7	100.3	100.3	100.2
Unit labor costs	162.8	163.6	166.1	165.0	166.2	167.5	169.0	169.4	170.2	169.8	171.4
Unit nonlabor payments	160.4	161.8	160.2	163.1	163.9	165.7	162.4	166.0	168.6	172.2	171.2
Implicit price deflator	162.0	163.0	164.0	164.3	165.4	166.9	166.7	168.2	169.6	170.7	171.3
Nonfarm business:											
Output per hour of all persons	105.7	106.4	105.9	107.7	107.7	107.5	107.5	107.6	108.0	109.1	109.0
Compensation per hour	174.1	176.2	178.3	180.0	181.3	182.6	184.4	184.9	186.3	187.9	189.5
Real compensation per hour	98.3	98.9	99.2	99.7	100.8	100.9	101.2	100.2	99.7	99.6	99.6
Unit labor costs	164.7	165.7	168.3	167.2	168.4	169.8	171.5	171.8	172.5	172.2	173.8
Unit nonlabor payments	161.5	163.4	160.8	164.7	165.2	167.0	163.9	167.4	169.2	173.0	171.9
Implicit price deflator	163.6	164.9	165.7	166.4	167.3	168.8	168.8	170.3	171.4	172.5	173.1
Nonfinancial corporations:											
Output per hour of all employees	107.7	109.2	108.9	109.8	109.7	109.9	110.5	109.7	109.9	110.8	–
Compensation per hour	171.8	173.8	175.7	177.2	178.4	179.5	181.0	180.8	182.0	183.3	–
Real compensation per hour	97.0	97.6	97.7	98.2	99.1	99.2	99.3	98.0	97.4	97.2	–
Total unit costs	164.3	163.7	166.0	166.3	167.2	168.5	168.7	169.7	170.9	171.0	–
Unit labor costs	159.5	159.1	161.4	161.5	162.6	163.2	163.8	164.8	165.6	165.5	–
Unit nonlabor costs	178.7	177.5	179.4	180.7	180.6	184.2	183.2	184.1	186.6	187.3	–
Unit profits	132.2	142.5	128.7	129.7	129.5	130.6	127.7	132.2	132.9	142.1	–
Unit nonlabor payments	162.5	165.2	161.6	162.8	162.7	165.4	163.7	165.9	167.8	171.4	–
Implicit price deflator	160.5	161.2	161.5	161.9	162.7	164.0	163.8	165.2	166.3	167.5	–
Manufacturing:											
Output per hour of all persons	124.1	125.3	126.1	127.6	128.4	129.3	129.8	130.8	132.9	134.1	134.1
Compensation per hour	176.1	178.0	180.2	181.0	182.1	183.1	184.3	183.9	184.8	185.4	186.3
Real compensation per hour	99.5	99.9	100.2	100.3	101.2	101.2	101.2	99.6	98.9	98.3	97.9
Unit labor costs	142.0	142.1	142.9	141.9	141.8	141.7	142.0	140.5	139.0	138.2	138.9

– Data not available.

43. Annual indexes of multifactor productivity and related measures, selected years

(1977=100)

Item	1960	1970	1973	1976	1978	1980	1981	1982	1983	1984	1985	1986
Private business												
Productivity:												
Output per hour of all persons	67.3	88.4	95.9	98.4	100.8	99.2	100.6	100.3	103.1	105.7	107.6	109.7
Output per unit of capital services	102.1	101.9	105.3	97.2	102.0	94.2	92.4	86.7	88.4	92.8	92.8	92.8
Multifactor productivity	78.1	92.9	99.1	98.0	101.2	97.4	97.7	95.3	97.7	101.0	102.2	103.4
Output	55.3	80.2	93.0	94.5	105.8	106.6	108.9	105.4	109.9	119.2	124.0	128.1
Inputs:												
Hours of all persons	82.2	90.8	96.9	96.1	105.0	107.5	108.2	105.2	106.7	112.8	115.2	116.8
Capital services	54.2	78.7	88.3	97.2	103.8	113.1	117.8	121.7	124.4	128.5	133.6	138.0
Combined units of labor and capital input	70.8	86.3	93.8	96.5	104.5	109.4	111.5	110.7	112.6	118.1	121.3	123.8
Capital per hour of all persons	65.9	86.7	91.1	101.2	98.8	105.3	108.8	115.7	116.6	113.9	116.0	118.2
Private nonfarm business												
Productivity:												
Output per hour of all persons	70.7	89.2	96.4	98.5	100.8	98.7	99.6	99.1	102.5	104.7	105.9	107.6
Output per unit of capital services	103.6	102.8	106.0	97.3	101.9	93.4	91.1	85.1	87.3	91.3	90.8	90.5
Multifactor productivity	80.9	93.7	99.6	98.1	101.2	96.9	96.7	94.1	97.0	99.9	100.5	101.4
Output	54.4	79.9	92.9	94.4	106.0	106.6	108.4	104.8	110.1	119.3	123.7	127.6
Inputs:												
Hours of all persons	77.0	89.6	96.3	95.8	105.1	108.0	108.8	105.7	107.4	114.0	116.8	118.5
Capital services	52.5	77.8	87.6	97.0	104.0	114.1	119.0	123.2	126.1	130.6	136.3	141.0
Combined units of labor and capital input	67.3	85.3	93.3	96.2	104.7	110.0	112.2	111.4	113.5	119.4	123.1	125.8
Capital per hour of all persons	68.2	86.8	91.0	101.3	98.9	105.6	109.4	116.5	117.4	114.6	116.7	119.0
Manufacturing												
Productivity:												
Output per hour of all persons	62.2	80.8	93.4	97.1	101.5	101.4	103.6	105.9	112.0	118.1	124.2	128.8
Output per unit of capital services	102.5	98.6	111.4	96.2	102.1	91.2	89.2	81.8	86.9	95.7	97.8	99.3
Multifactor productivity	71.9	85.2	97.9	96.8	101.7	98.7	99.8	99.2	105.1	112.2	117.0	120.6
Output	52.5	78.6	96.3	93.1	106.0	103.2	104.8	98.4	104.7	117.5	122.5	125.9
Inputs:												
Hours of all persons	84.4	97.3	103.1	95.9	104.4	101.7	101.1	92.9	93.5	99.5	98.7	97.8
Capital services	51.2	79.7	86.4	96.7	103.7	113.1	117.5	120.3	120.6	122.8	125.3	126.8
Combined units of labor and capital inputs	73.0	92.2	98.4	96.1	104.2	104.5	105.0	99.2	99.7	104.7	104.8	104.4
Capital per hour of all persons	60.7	82.0	83.8	100.9	99.4	111.2	116.2	129.4	129.0	123.5	127.0	129.7

44. Annual indexes of productivity, hourly compensation, unit costs, and prices, selected years

(1977=100)

Item	1960	1970	1973	1976	1978	1980	1981	1982	1983	1984	1985	1986	1987
Business:													
Output per hour of all persons	67.6	88.4	95.9	98.3	100.8	99.3	100.7	100.3	103.0	105.6	107.5	109.5	110.5
Compensation per hour	33.6	57.8	70.9	92.8	108.5	131.5	143.7	154.9	161.5	168.0	175.9	182.8	188.2
Real compensation per hour	68.9	90.2	96.7	98.7	100.8	96.7	95.7	97.3	98.2	98.0	99.1	101.0	100.3
Unit labor costs	49.7	65.4	73.9	94.3	107.6	132.5	142.7	154.5	156.7	159.1	163.6	166.9	170.2
Unit nonlabor payments	46.4	59.4	72.5	93.3	106.7	118.7	134.6	136.6	146.4	156.5	160.3	163.8	169.5
Implicit price deflator	48.5	63.2	73.4	94.0	107.3	127.6	139.8	148.1	153.0	158.2	162.4	165.8	170.0
Nonfarm business:													
Output per hour of all persons	71.0	89.3	96.4	98.5	100.8	98.8	99.8	99.2	102.5	104.6	105.8	107.5	108.4
Compensation per hour	35.3	58.2	71.2	92.8	108.6	131.3	143.6	154.8	161.5	167.8	175.2	182.0	187.1
Real compensation per hour	72.3	90.8	97.1	98.8	100.9	96.6	95.7	97.2	98.2	97.9	98.7	100.6	99.8
Unit labor costs	49.7	65.2	73.9	94.3	107.7	132.9	144.0	156.0	157.6	160.4	165.6	169.3	172.6
Unit nonlabor payments	46.3	60.0	69.3	93.0	105.6	118.5	133.5	136.5	148.3	156.4	161.3	165.2	170.4
Implicit price deflator	48.5	63.4	72.3	93.8	107.0	127.8	140.3	149.2	154.3	159.0	164.1	167.8	171.8
Nonfinancial corporations:													
Output per hour of all employees	73.4	91.1	97.5	98.4	100.6	99.1	99.6	100.4	103.5	106.0	108.2	109.9	–
Compensation per hour	36.9	59.2	71.6	92.9	108.4	131.1	143.3	154.3	159.9	165.8	172.8	178.9	–
Real compensation per hour	75.5	92.4	97.6	98.9	100.7	96.4	95.5	96.9	97.3	96.7	97.4	98.9	–
Total unit costs	49.4	64.8	72.7	94.8	107.3	133.4	147.7	159.5	159.5	160.8	164.4	167.7	–
Unit labor costs	50.2	65.0	73.4	94.3	107.8	132.3	143.8	153.8	154.5	156.5	159.7	162.8	–
Unit nonlabor costs	47.0	64.2	70.7	96.2	105.7	136.7	159.1	176.4	174.3	173.6	178.3	182.2	–
Unit profits	59.8	52.3	65.6	89.4	102.0	85.2	98.1	78.5	110.9	136.5	133.9	129.3	–
Unit nonlabor payments	51.5	60.1	68.9	93.8	104.4	118.6	137.8	142.1	152.1	160.6	162.7	163.7	–
Implicit price deflator	50.7	63.3	71.9	94.2	106.6	127.6	141.7	149.8	153.7	157.9	160.7	163.1	–
Manufacturing:													
Output per hour of all persons	62.2	80.8	93.4	97.1	101.5	101.4	103.6	105.9	112.0	118.1	124.2	128.8	133.0
Compensation per hour	36.5	57.4	68.8	92.1	108.2	132.4	145.2	157.5	162.4	168.0	176.9	182.7	185.1
Real compensation per hour	74.8	89.5	93.8	98.1	100.5	97.4	96.7	98.9	98.8	98.0	99.6	100.9	98.7
Unit labor costs	58.7	71.0	73.7	94.9	106.6	130.6	140.1	148.7	145.0	142.2	142.4	141.8	139.1
Unit nonlabor payments	60.0	64.1	70.7	93.5	101.9	97.8	111.8	114.0	128.5	138.6	134.7	137.9	–
Implicit price deflator	59.1	69.0	72.8	94.5	105.2	121.0	131.8	138.6	140.2	141.2	140.2	140.7	–

– Data not available.

45. Unemployment rates, approximating U.S. concepts, in nine countries, quarterly data seasonally adjusted

Country	Annual average		1986			1987			
	1986	1987	II	III	IV	I	II	III	IV
Total labor force basis									
United States	6.9	6.1	7.1	6.9	6.8	6.5	6.2	5.9	5.8
Canada	9.5	–	9.5	9.6	9.4	9.6	9.0	8.8	8.0
Australia	8.0	–	7.7	8.2	8.3	8.3	8.1	8.0	7.9
Japan	2.8	–	2.8	2.9	2.9	3.0	3.1	2.8	2.7
France	10.4	–	10.4	10.6	10.6	10.9	11.0	10.8	10.6
Germany	7.1	–	7.2	7.0	6.9	7.0	7.0	7.1	7.1
Italy [1, 2]	6.2	–	6.2	5.9	6.5	6.6	6.6	6.6	6.9
Sweden	2.6	–	2.6	2.6	2.6	2.0	1.9	1.9	1.7
United Kingdom	11.1	–	11.2	11.1	10.9	10.6	10.2	9.7	9.1
Civilian labor force basis									
United States	7.0	6.2	7.2	7.0	6.8	6.6	6.3	6.0	5.9
Canada	9.6	–	9.6	9.7	9.4	9.6	9.1	8.8	8.1
Australia	8.1	–	7.8	8.3	8.4	8.3	8.2	8.0	8.0
Japan	2.8	–	2.8	2.9	2.9	3.0	3.1	2.8	2.8
France	10.7	–	10.7	10.8	10.8	11.2	11.2	11.1	10.8
Germany	7.2	–	7.3	7.2	7.0	7.1	7.2	7.2	7.3
Italy [1, 2]	6.3	–	6.3	6.0	6.6	6.7	6.7	6.8	7.0
Sweden	2.7	–	2.6	2.6	2.6	2.0	1.9	1.9	1.7
United Kingdom	11.1	–	11.2	11.2	10.9	10.7	10.3	9.8	9.2

[1] Quarterly rates are for the first month of the quarter.

[2] Major changes in the Italian labor force survey, introduced in 1977, resulted in a large increase in persons enumerated as unemployed. However, many persons reported that they had not actively sought work in the past 30 days, and they have been provisionally excluded for comparability with U.S. concepts. Inclusion of such persons would about double the Italian unemployment rate shown.

– Data not available.

NOTE: Quarterly figures for France, Germany, and the United Kingdom are calculated by applying annual adjustment factors to current published data and therefore should be viewed as less precise indicators of unemployment under U.S. concepts than the annual figures.

46. Annual data: Employment status of the civilian working-age population, approximating U.S. concepts, 10 countries

(Numbers in thousands)

Employment status and country	1978	1979	1980	1981	1982	1983	1984	1985	1986
Labor force									
United States	102,251	104,962	106,940	108,670	110,204	111,550	113,544	115,461	117,834
Canada	10,895	11,231	11,573	11,904	11,958	12,183	12,399	12,639	12,870
Australia	6,443	6,519	6,693	6,810	6,910	6,997	7,133	7,272	7,562
Japan	54,610	55,210	55,740	56,320	56,980	58,110	58,480	58,820	59,410
France	22,460	22,670	22,800	22,930	23,160	23,130	23,290	23,340	23,480
Germany	26,000	26,250	26,520	26,650	26,700	26,650	26,760	26,980	27,180
Italy	20,570	20,850	21,120	21,320	21,410	21,590	21,670	21,800	21,990
Netherlands	5,010	5,100	5,310	5,520	5,570	5,600	5,620	5,710	5,760
Sweden	4,203	4,262	4,312	4,327	4,350	4,369	4,385	4,418	4,437
United Kingdom	26,260	26,350	26,520	26,590	26,740	26,790	27,180	27,370	27,460
Participation rate[1]									
United States	63.2	63.7	63.8	63.9	64.0	64.0	64.4	64.8	65.3
Canada	62.7	63.4	64.1	64.8	64.1	64.4	64.8	65.2	65.7
Australia	61.9	61.6	62.1	61.9	61.7	61.4	61.5	61.8	63.0
Japan	62.8	62.7	62.6	62.6	62.7	63.1	62.7	62.3	62.1
France	57.5	57.5	57.2	57.1	57.1	56.6	56.6	56.2	56.2
Germany	53.3	53.3	53.2	52.9	52.6	52.3	52.4	52.6	53.0
Italy	47.8	48.0	48.2	48.3	47.7	47.5	47.3	47.2	47.5
Netherlands	48.8	49.0	50.2	51.4	51.2	50.9	50.5	50.7	50.8
Sweden	66.1	66.6	66.9	66.8	66.8	66.7	66.6	66.9	67.2
United Kingdom	62.8	62.6	62.5	62.2	62.3	62.1	62.6	62.7	62.5
Employed									
United States	96,048	98,824	99,303	100,397	99,526	100,834	105,005	107,150	109,597
Canada	9,987	10,395	10,708	11,006	10,644	10,734	11,000	11,311	11,634
Australia	6,038	6,111	6,284	6,416	6,415	6,300	6,490	6,670	6,952
Japan	53,370	54,040	54,600	55,060	55,620	56,550	56,870	57,260	57,740
France	21,250	21,300	21,330	21,200	21,240	21,170	20,980	20,900	20,970
Germany	25,130	25,470	25,750	25,560	25,140	24,750	24,790	24,950	25,210
Italy	19,720	19,930	20,200	20,280	20,250	20,320	20,390	20,490	20,610
Netherlands	4,750	4,830	4,980	5,010	4,980	4,890	4,930	5,110	5,200
Sweden	4,109	4,174	4,226	4,219	4,213	4,218	4,249	4,293	4,319
United Kingdom	24,610	24,940	24,670	23,800	23,710	23,600	24,000	24,300	24,400
Employment-population ratio[2]									
United States	59.3	59.9	59.2	59.0	57.8	57.9	59.5	60.1	60.7
Canada	57.5	58.7	59.3	59.9	57.0	56.7	57.4	58.4	59.4
Australia	58.0	57.8	58.3	58.4	57.3	55.3	56.0	56.6	57.9
Japan	61.3	61.4	61.3	61.2	61.2	61.4	61.0	60.6	60.4
France	54.4	54.0	53.5	52.8	52.3	51.8	51.0	50.4	50.2
Germany	51.5	51.7	51.7	50.8	49.6	48.6	48.5	48.7	49.1
Italy	45.9	45.9	46.1	45.9	45.2	44.7	44.5	44.4	44.6
Netherlands	46.3	46.4	47.0	46.6	45.8	44.5	44.3	45.4	45.9
Sweden	64.6	65.3	65.6	65.1	64.7	64.4	64.5	65.0	65.4
United Kingdom	58.8	59.2	58.1	55.7	55.3	54.7	55.3	55.7	55.6
Unemployed									
United States	6,202	6,137	7,637	8,273	10,678	10,717	8,539	8,312	8,237
Canada	908	836	865	898	1,314	1,448	1,399	1,328	1,236
Australia	405	408	409	394	495	697	642	602	610
Japan	1,240	1,170	1,140	1,260	1,360	1,560	1,610	1,560	1,670
France	1,210	1,370	1,470	1,730	1,920	1,960	2,310	2,440	2,510
Germany	870	780	770	1,090	1,560	1,900	1,970	2,030	1,970
Italy	850	920	920	1,040	1,160	1,270	1,280	1,310	1,380
Netherlands	260	270	330	510	590	710	690	600	560
Sweden	94	88	86	108	137	151	136	125	118
United Kingdom	1,650	1,420	1,850	2,790	3,030	3,190	3,180	3,070	3,060
Unemployment rate									
United States	6.1	5.8	7.1	7.6	9.7	9.6	7.5	7.2	7.0
Canada	8.3	7.4	7.5	7.5	11.0	11.9	11.3	10.5	9.6
Australia	6.3	6.3	6.1	5.8	7.2	10.0	9.0	8.3	8.1
Japan	2.3	2.1	2.0	2.2	2.4	2.7	2.8	2.6	2.8
France	5.4	6.0	6.4	7.5	8.3	8.5	9.9	10.4	10.7
Germany	3.3	3.0	2.9	4.1	5.8	7.1	7.4	7.5	7.2
Italy	4.1	4.4	4.4	4.9	5.4	5.9	5.9	6.0	6.3
Netherlands	5.2	5.3	6.2	9.2	10.6	12.7	12.3	10.5	9.7
Sweden	2.2	2.1	2.0	2.5	3.1	3.5	3.1	2.8	2.7
United Kingdom	6.3	5.4	7.0	10.5	11.3	11.9	11.7	11.2	11.1

[1] Labor force as a percent of the civilian working-age population.
[2] Employment as a percent of the civilian working-age population.
– Data not available.

47. Annual indexes of manufacturing productivity and related measures, 12 countries

(1977=100)

Item and country	1960	1970	1973	1975	1976	1977	1979	1980	1981	1982	1983	1984	1985	1986
Output per hour														
United States	62.2	80.8	93.4	92.9	97.1	100.0	101.4	101.4	103.6	105.9	112.0	118.1	124.2	128.8
Canada	50.7	75.6	90.3	88.6	94.8	100.0	102.0	98.2	102.9	98.3	105.4	116.8	119.7	119.4
Japan	23.2	64.8	83.1	87.7	94.3	100.0	114.8	122.7	127.2	135.0	142.3	152.5	163.7	168.2
Belgium	33.0	60.4	78.8	86.5	95.3	100.0	111.9	119.2	127.6	135.2	148.2	154.4	159.0	163.1
Denmark	37.2	65.6	83.3	94.6	98.2	100.0	106.5	112.3	114.2	114.6	120.2	118.6	118.3	119.9
France	36.4	69.6	82.3	88.5	95.1	100.0	109.7	110.6	114.0	122.0	125.2	129.0	133.0	135.6
Germany	40.3	71.2	84.0	90.1	96.5	100.0	108.2	108.6	111.0	112.6	119.2	123.6	128.7	130.6
Italy	35.4	72.7	90.9	91.1	98.9	100.0	110.5	116.9	124.8	129.6	135.7	144.4	146.6	148.3
Netherlands	32.4	64.3	81.5	86.2	95.8	100.0	112.3	113.9	116.9	119.4	127.5	140.5	145.1	144.7
Norway	54.6	81.7	94.6	96.8	99.7	100.0	107.1	106.7	107.0	109.8	117.2	123.9	125.2	124.4
Sweden	42.3	80.7	94.8	100.2	101.7	100.0	110.9	112.7	113.2	116.5	125.5	131.0	136.1	136.4
United Kingdom	55.9	80.4	95.5	94.9	99.1	100.0	102.5	101.8	107.0	113.5	123.2	129.8	134.7	139.5
Output														
United States	52.5	78.6	96.3	84.9	93.1	100.0	108.1	103.2	104.8	98.4	104.7	117.5	122.5	125.9
Canada	41.3	73.5	93.5	89.9	96.5	100.0	108.5	103.6	107.4	93.6	99.6	114.9	121.2	123.9
Japan	19.2	69.9	91.9	86.2	94.8	100.0	113.9	124.1	129.8	137.3	148.2	165.4	179.3	182.1
Belgium	41.9	78.6	96.4	92.7	99.7	100.0	104.1	106.8	105.7	110.1	114.8	117.5	119.9	122.0
Denmark	49.2	82.0	95.9	95.0	99.6	100.0	105.4	110.1	106.6	108.3	115.6	119.7	123.4	126.7
France	35.4	73.3	88.6	90.0	96.1	100.0	105.3	104.6	102.9	104.0	103.8	104.0	103.3	103.0
Germany	50.0	86.6	96.1	91.0	98.0	100.0	106.6	106.6	104.9	102.4	103.6	106.4	110.1	112.8
Italy	36.4	78.0	90.5	86.9	97.9	100.0	108.6	115.4	115.1	113.4	111.5	116.2	118.0	121.9
Netherlands	44.8	84.4	95.8	92.7	99.0	100.0	106.1	106.6	106.7	105.0	107.0	113.3	116.0	117.3
Norway	55.1	86.9	99.5	101.0	101.4	100.0	100.3	98.8	97.7	97.4	97.2	102.6	105.2	107.0
Sweden	52.6	92.5	100.3	106.1	106.1	100.0	103.6	104.0	100.6	100.1	105.2	111.5	115.3	115.2
United Kingdom	71.2	95.0	104.8	96.3	98.2	100.0	100.5	91.7	86.2	86.4	88.9	92.5	95.2	96.2
Total hours														
United States	84.4	97.3	103.1	91.4	95.9	100.0	106.5	101.7	101.1	92.9	93.5	99.5	98.7	97.8
Canada	81.4	97.2	103.6	101.5	101.8	100.0	106.3	105.5	104.3	95.2	94.5	98.3	101.2	103.8
Japan	82.7	107.9	110.7	98.2	100.6	100.0	99.3	101.2	102.0	101.7	104.2	108.5	109.6	108.3
Belgium	127.1	130.2	122.3	107.1	104.6	100.0	93.0	89.6	82.8	81.4	77.5	76.1	75.4	74.8
Denmark	132.4	125.1	115.2	100.4	101.4	100.0	99.0	98.0	93.4	94.5	96.2	100.9	104.3	105.7
France	97.2	105.3	107.7	101.7	101.2	100.0	95.9	94.6	90.3	85.2	82.9	80.6	77.7	75.9
Germany	123.8	121.7	114.4	101.0	101.6	100.0	98.5	98.1	94.6	91.0	86.9	86.1	85.6	86.4
Italy	102.8	107.4	99.6	95.4	99.0	100.0	98.2	98.7	92.2	87.5	82.2	80.5	80.5	82.2
Netherlands	138.4	131.2	117.6	107.6	103.3	100.0	94.4	93.6	91.2	88.0	83.9	80.6	79.9	81.1
Norway	101.0	106.4	105.1	104.3	101.7	100.0	93.6	92.6	91.3	88.6	82.9	82.8	84.0	86.0
Sweden	124.4	114.6	105.7	105.9	104.3	100.0	93.4	92.3	88.9	85.9	83.9	85.1	84.7	84.5
United Kingdom	127.3	118.1	109.8	101.5	99.0	100.0	98.0	90.1	80.6	76.2	72.2	71.2	70.7	69.0
Compensation per hour														
United States	36.5	57.4	68.8	85.1	92.1	100.0	118.6	132.4	145.2	157.5	162.4	168.0	176.9	182.7
Canada	27.5	47.9	60.0	78.9	90.3	100.0	118.6	131.3	151.1	167.0	177.2	185.5	194.7	202.3
Japan	8.9	33.9	55.1	84.2	90.7	100.0	113.4	120.7	129.8	136.6	140.7	144.9	152.0	157.3
Belgium	13.8	34.9	53.5	79.0	89.5	100.0	117.5	130.4	144.5	150.7	159.7	173.0	184.9	191.8
Denmark	12.6	36.3	56.1	81.0	90.4	100.0	123.1	135.9	149.7	162.9	174.2	184.4	196.1	207.7
France	15.1	36.5	52.1	76.5	88.7	100.0	128.4	148.5	172.0	203.9	225.2	247.3	267.3	279.2
Germany	18.8	48.0	67.5	84.5	91.3	100.0	116.1	125.6	134.5	141.0	148.3	155.5	164.9	172.5
Italy	8.4	26.1	43.7	70.2	84.2	100.0	134.7	160.2	198.4	238.3	282.8	314.5	347.3	362.1
Netherlands	12.5	39.0	60.5	82.2	91.9	100.0	117.0	123.6	129.1	137.5	144.0	150.0	157.7	161.5
Norway	15.8	37.9	54.5	77.2	88.8	100.0	116.0	128.0	142.8	156.0	173.5	188.3	204.8	224.6
Sweden	14.7	38.5	54.2	77.3	91.5	100.0	120.1	133.6	148.1	158.9	173.3	189.7	212.4	228.1
United Kingdom	15.1	31.3	47.5	76.0	88.3	100.0	137.4	167.4	193.9	209.3	224.4	238.8	254.6	273.5
Unit labor costs: National currency basis														
United States	58.7	71.0	73.7	91.7	94.9	100.0	117.0	130.6	140.1	148.7	145.0	142.2	142.4	141.8
Canada	54.2	63.4	66.5	89.1	95.3	100.0	116.2	133.7	146.7	170.0	168.1	158.8	162.6	169.4
Japan	38.4	52.3	66.4	96.0	96.2	100.0	98.8	98.4	102.0	101.2	98.9	95.0	92.9	93.5
Belgium	41.7	57.8	67.9	91.2	93.9	100.0	105.0	109.4	113.2	111.4	107.8	112.1	116.3	117.6
Denmark	33.8	55.4	67.4	85.6	92.1	100.0	115.7	121.0	131.1	142.2	144.9	155.4	165.7	173.2
France	41.5	52.5	63.4	86.5	93.3	100.0	117.0	134.3	151.0	167.2	179.9	191.6	200.9	205.9
Germany	46.6	67.4	80.3	93.8	94.6	100.0	107.3	115.7	121.2	125.2	124.4	125.8	128.1	132.1
Italy	23.7	36.0	48.1	77.1	85.1	100.0	121.9	137.0	158.9	184.0	208.4	217.8	236.9	244.1
Netherlands	38.5	60.7	74.3	95.4	96.0	100.0	104.1	108.5	110.4	115.2	113.0	106.8	108.7	111.6
Norway	29.0	46.4	57.6	79.7	89.1	100.0	108.2	120.0	133.4	142.1	148.0	152.0	163.5	180.5
Sweden	34.8	47.7	57.2	77.1	90.0	100.0	108.3	118.6	130.9	136.3	138.1	144.8	156.1	167.3
United Kingdom	27.1	38.9	49.8	80.2	89.1	100.0	134.1	164.5	181.2	184.4	182.2	183.9	189.0	196.1
Unit labor costs: U.S. dollar basis														
United States	58.7	71.0	73.7	91.7	94.9	100.0	117.0	130.6	140.1	148.7	145.0	142.2	142.4	141.8
Canada	59.4	64.5	70.6	93.1	102.7	100.0	105.4	121.5	130.0	146.3	144.9	130.3	126.5	129.5
Japan	28.5	39.1	65.6	86.7	86.9	100.0	121.3	116.8	123.8	108.8	111.5	107.2	104.3	148.7
Belgium	30.0	41.7	62.7	89.1	87.2	100.0	128.3	134.3	109.6	87.2	75.5	69.5	70.2	94.3
Denmark	29.5	44.4	67.2	89.6	91.5	100.0	132.0	129.0	110.3	102.3	95.1	90.1	93.9	128.4
France	41.6	46.7	70.2	99.3	96.1	100.0	135.2	156.4	136.4	124.9	116.1	107.8	110.0	146.2
Germany	25.9	42.9	70.4	88.7	87.3	100.0	135.9	147.9	124.9	119.7	113.1	102.6	101.1	141.3
Italy	33.7	50.6	73.1	104.3	90.5	100.0	129.5	141.4	123.2	119.9	121.1	109.5	109.6	144.5
Netherlands	25.1	41.2	65.6	92.8	89.1	100.0	127.4	134.1	108.9	105.8	97.1	81.6	80.4	111.9
Norway	21.7	34.5	53.4	81.4	86.9	100.0	113.8	129.3	123.6	117.1	107.9	99.1	101.3	129.8
Sweden	30.1	41.1	58.7	83.2	92.3	100.0	112.9	125.3	115.4	96.9	80.4	78.2	81.1	104.9
United Kingdom	43.6	53.5	70.0	102.0	92.1	100.0	163.1	219.2	210.2	184.8	158.3	140.9	140.5	164.9

– Data not available.

48. Occupational injury and illness incidence rates by industry, United States

Industry and type of case[1]	Incidence rates per 100 full-time workers[2]								
	1978	1979	1980	1981	1982	1983	1984	1985	1986
PRIVATE SECTOR[3]									
Total cases	9.4	9.5	8.7	8.3	7.7	7.6	8.0	7.9	7.9
Lost workday cases	4.1	4.3	4.0	3.8	3.5	3.4	3.7	3.6	3.6
Lost workdays	63.5	67.7	65.2	61.7	58.7	58.5	63.4	64.9	65.8
Agriculture, forestry, and fishing[3]									
Total cases	11.6	11.7	11.9	12.3	11.8	11.9	12.0	11.4	11.2
Lost workday cases	5.4	5.7	5.8	5.9	5.9	6.1	6.1	5.7	5.6
Lost workdays	80.7	83.7	82.7	82.8	86.0	90.8	90.7	91.3	93.6
Mining									
Total cases	11.5	11.4	11.2	11.6	10.5	8.4	9.7	8.4	7.4
Lost workday cases	6.4	6.8	6.5	6.2	5.4	4.5	5.3	4.8	4.1
Lost workdays	143.2	150.5	163.6	146.4	137.3	125.1	160.2	145.3	125.9
Construction									
Total cases	16.0	16.2	15.7	15.1	14.6	14.8	15.5	15.2	15.2
Lost workday cases	6.4	6.8	6.5	6.3	6.0	6.3	6.9	6.8	6.9
Lost workdays	109.4	120.4	117.0	113.1	115.7	118.2	128.1	128.9	134.5
General building contractors:									
Total cases	15.9	16.3	15.5	15.1	14.1	14.4	15.4	15.2	14.9
Lost workday cases	6.3	6.8	6.5	6.1	5.9	6.2	6.9	6.8	6.6
Lost workdays	105.3	111.2	113.0	107.1	112.0	113.0	121.3	120.4	122.7
Heavy construction contractors:									
Total cases	16.6	16.6	16.3	14.9	15.1	15.4	14.9	14.5	14.7
Lost workday cases	6.2	6.7	6.3	6.0	5.8	6.2	6.4	6.3	6.3
Lost workdays	110.9	123.1	117.6	106.0	113.1	122.4	131.7	127.3	132.9
Special trade contractors:									
Total cases	15.8	16.0	15.5	15.2	14.7	14.8	15.8	15.4	15.6
Lost workday cases	6.6	6.9	6.7	6.6	6.2	6.4	7.1	7.0	7.2
Lost workdays	111.0	124.3	118.9	119.3	118.6	119.0	130.1	133.3	140.4
Manufacturing									
Total cases	13.2	13.3	12.2	11.5	10.2	10.0	10.6	10.4	10.6
Lost workday cases	5.6	5.9	5.4	5.1	4.4	4.3	4.7	4.6	4.7
Lost workdays	84.9	90.2	86.7	82.0	75.0	73.5	77.9	80.2	85.2
Durable goods									
Lumber and wood products:									
Total cases	22.6	20.7	18.6	17.6	16.9	18.3	19.6	18.5	18.9
Lost workday cases	11.1	10.8	9.5	9.0	8.3	9.2	9.9	9.3	9.7
Lost workdays	178.8	175.9	171.8	158.4	153.3	163.5	172.0	171.4	177.2
Furniture and fixtures:									
Total cases	17.5	17.6	16.0	15.1	13.9	14.1	15.3	15.0	15.2
Lost workday cases	6.9	7.1	6.6	6.2	5.5	5.7	6.4	6.3	6.3
Lost workdays	95.9	99.6	97.6	91.9	85.6	83.0	101.5	100.4	103.0
Stone, clay, and glass products:									
Total cases	16.8	16.8	15.0	14.1	13.0	13.1	13.6	13.9	13.6
Lost workday cases	7.8	8.0	7.1	6.9	6.1	6.0	6.6	6.7	6.5
Lost workdays	126.3	133.7	128.1	122.2	112.2	112.0	120.8	127.8	126.0
Primary metal industries:									
Total cases	17.0	17.3	15.2	14.4	12.4	12.4	13.3	12.6	13.6
Lost workday cases	7.5	8.1	7.1	6.7	5.4	5.4	6.1	5.7	6.1
Lost workdays	123.6	134.7	128.3	121.3	101.6	103.4	115.3	113.8	125.5
Fabricated metal products:									
Total cases	19.3	19.9	18.5	17.5	15.3	15.1	16.1	16.3	16.0
Lost workday cases	8.0	8.7	8.0	7.5	6.4	6.1	6.7	6.9	6.8
Lost workdays	112.4	124.2	118.4	109.9	102.5	96.5	104.9	110.1	115.5
Machinery, except electrical:									
Total cases	14.4	14.7	13.7	12.9	10.7	9.8	10.7	10.8	10.7
Lost workday cases	5.4	5.9	5.5	5.1	4.2	3.6	4.1	4.2	4.2
Lost workdays	75.1	83.6	81.3	74.9	66.0	58.1	65.8	69.3	72.0
Electric and electronic equipment:									
Total cases	8.7	8.6	8.0	7.4	6.5	6.3	6.8	6.4	6.4
Lost workday cases	3.3	3.4	3.3	3.1	2.7	2.6	2.8	2.7	2.7
Lost workdays	50.3	51.9	51.8	48.4	42.2	41.4	45.0	45.7	49.8
Transportation equipment:									
Total cases	11.5	11.6	10.6	9.8	9.2	8.4	9.3	9.0	9.6
Lost workday cases	5.1	5.5	4.9	4.6	4.0	3.6	4.2	3.9	4.1
Lost workdays	78.0	85.9	82.4	78.1	72.2	64.5	68.8	71.6	79.1
Instruments and related products:									
Total cases	6.9	7.2	6.8	6.5	5.6	5.2	5.4	5.2	5.3
Lost workday cases	2.6	2.8	2.7	2.7	2.3	2.1	2.2	2.2	2.3
Lost workdays	37.0	40.0	41.8	39.2	37.0	35.6	37.5	37.9	42.2
Miscellaneous manufacturing industries:									
Total cases	11.8	11.7	10.9	10.7	9.9	9.9	10.5	9.7	10.2
Lost workday cases	4.5	4.7	4.4	4.4	4.1	4.0	4.3	4.2	4.3
Lost workdays	66.4	67.7	67.9	68.3	69.9	66.3	70.2	73.2	70.9

See footnotes at end of table.

48. Continued— Occupational injury and illness incidence rates by industry, United States

Industry and type of case[1]	Incidence rates per 100 full-time workers[2]								
	1978	1979	1980	1981	1982	1983	1984	1985	1986
Nondurable goods									
Food and kindred products:									
Total cases	19.4	19.9	18.7	17.8	16.7	16.5	16.7	16.7	16.5
Lost workday cases	8.9	9.5	9.0	8.6	8.0	7.9	8.1	8.1	8.0
Lost workdays	132.2	141.8	136.8	130.7	129.3	131.2	131.6	138.0	137.8
Tobacco manufacturing:									
Total cases	8.7	9.3	8.1	8.2	7.2	6.5	7.7	7.3	6.7
Lost workday cases	4.0	4.2	3.8	3.9	3.2	3.0	3.2	3.0	2.5
Lost workdays	58.6	64.8	45.8	56.8	44.6	42.8	51.7	51.7	45.6
Textile mill products:									
Total cases	10.2	9.7	9.1	8.8	7.6	7.4	8.0	7.5	7.8
Lost workday cases	3.4	3.4	3.3	3.2	2.8	2.8	3.0	3.0	3.1
Lost workdays	61.5	61.3	62.8	59.2	53.8	51.4	54.0	57.4	59.3
Apparel and other textile products:									
Total cases	6.5	6.5	6.4	6.3	6.0	6.4	6.7	6.7	6.7
Lost workday cases	2.2	2.2	2.2	2.2	2.1	2.4	2.5	2.6	2.7
Lost workdays	32.4	34.1	34.9	35.0	36.4	40.6	40.9	44.1	49.4
Paper and allied products:									
Total cases	13.5	13.5	12.7	11.6	10.6	10.0	10.4	10.2	10.5
Lost workday cases	5.7	6.0	5.8	5.4	4.9	4.5	4.7	4.7	4.7
Lost workdays	103.3	108.4	112.3	103.6	99.1	90.3	93.8	94.6	99.5
Printing and publishing:									
Total cases	7.0	7.1	6.9	6.7	6.6	6.6	6.5	6.3	6.5
Lost workday cases	2.9	3.1	3.1	3.0	2.8	2.9	2.9	2.9	2.9
Lost workdays	43.8	45.1	46.5	47.4	45.7	44.6	46.0	49.2	50.8
Chemicals and allied products:									
Total cases	7.8	7.7	6.8	6.6	5.7	5.5	5.3	5.1	6.3
Lost workday cases	3.3	3.5	3.1	3.0	2.5	2.5	2.4	2.3	2.7
Lost workdays	50.9	54.9	50.3	48.1	39.4	42.3	40.8	38.8	49.4
Petroleum and coal products:									
Total cases	7.9	7.7	7.2	6.7	5.3	5.5	5.1	5.1	7.1
Lost workday cases	3.4	3.6	3.5	2.9	2.5	2.4	2.4	2.4	3.2
Lost workdays	58.3	62.0	59.1	51.2	46.4	46.8	53.5	49.9	67.5
Rubber and miscellaneous plastics products:									
Total cases	17.1	17.1	15.5	14.6	12.7	13.0	13.6	13.4	14.0
Lost workday cases	8.1	8.2	7.4	7.2	6.0	6.2	6.4	6.3	6.6
Lost workdays	125.5	127.1	118.6	117.4	100.9	101.4	104.3	107.4	118.2
Leather and leather products:									
Total cases	11.7	11.5	11.7	11.5	9.9	10.0	10.5	10.3	10.5
Lost workday cases	4.7	4.9	5.0	5.1	4.5	4.4	4.7	4.6	4.8
Lost workdays	72.5	76.2	82.7	82.6	86.5	87.3	94.4	88.3	83.4
Transportation and public utilities									
Total cases	10.1	10.0	9.4	9.0	8.5	8.2	8.8	8.6	8.2
Lost workday cases	5.7	5.9	5.5	5.3	4.9	4.7	5.2	5.0	4.8
Lost workdays	102.3	107.0	104.5	100.6	96.7	94.9	105.1	107.1	102.1
Wholesale and retail trade									
Total cases	7.9	8.0	7.4	7.3	7.2	7.2	7.4	7.4	7.7
Lost workday cases	3.2	3.4	3.2	3.1	3.1	3.1	3.3	3.2	3.3
Lost workdays	44.9	49.0	48.7	45.3	45.5	47.8	50.5	50.7	54.0
Wholesale trade:									
Total cases	8.9	8.8	8.2	7.7	7.1	7.0	7.2	7.2	7.2
Lost workday cases	3.9	4.1	3.9	3.6	3.4	3.2	3.5	3.5	3.6
Lost workdays	57.5	59.1	58.2	54.7	52.1	50.6	55.5	59.8	62.5
Retail trade:									
Total cases	7.5	7.7	7.1	7.1	7.2	7.3	7.5	7.5	7.8
Lost workday cases	2.8	3.1	2.9	2.9	2.9	3.0	3.2	3.1	3.2
Lost workdays	39.7	44.7	44.5	41.1	42.6	46.7	48.4	47.0	50.5
Finance, insurance, and real estate									
Total cases	2.1	2.1	2.0	1.9	2.0	2.0	1.9	2.0	2.0
Lost workday cases	.8	.9	.8	.8	.9	.9	.9	.9	.9
Lost workdays	12.5	13.3	12.2	11.6	13.2	12.8	13.6	15.4	17.1
Services									
Total cases	5.5	5.5	5.2	5.0	4.9	5.1	5.2	5.4	5.3
Lost workday cases	2.4	2.5	2.3	2.3	2.3	2.4	2.5	2.6	2.5
Lost workdays	36.2	38.1	35.8	35.9	35.8	37.0	41.1	45.4	43.0

[1] Total cases include fatalities.

[2] The incidence rates represent the number of injuries and illnesses or lost workdays per 100 full-time workers and were calculated as:
(N/EH) X 200,000, where:
N = number of injuries and illnesses or lost workdays.
EH = total hours worked by all employees during calendar year.
200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year.)

[3] Excludes farms with fewer than 11 employees since 1976.

NEW FROM BLS

SALES PUBLICATIONS

BLS Bulletins

Bargaining Calendar 1988. Bulletin 2294, 33 pp. (GPO Stock No. 029-001-02937-3.) $2. Presents information on anticipated bargaining activity in private industry and in State and local government in 1988. Information is identified by employer and union names relate only to major bargaining situations (those covering 1,000 workers or more) in which contracts expire or are subject to reopening during the year.

Area Wage Surveys. These bulletins cover office, professional, technical, maintenance, custodial, and material movement jobs in major metropolitan areas. Beginning in January 1987, the current program of annual surveys of 70 areas changed to a program of 90 surveys—32 surveyed every year and two groups of 29 areas surveyed in alternate years. The annual series is available by subscription for $103 per year. Individual area bulletins are also available separately.

Bergen—Passaic, New Jersey, Metropolitan Area, September 1987. Bulletin 3040-48, 48 pp. (GPO Stock No. 829-001-00191-4.) $2.50.

Billings, Montana, Metropolitan Area, November 1987. Bulletin 3040-44, 26 pp. (GPO Stock No. 829-001-00187-6.) $1.50.

Elkhart—Goshen, Indiana, Metropolitan Area, October 1987. Bulletin 3040-43, 41 pp. (GPO Stock No. 829-001-00186-8.) $2.25.

Los Angeles—Long Beach, California, Metropolitan Area, October 1987. Bulletin 3040-45, 41 pp. (GPO Stock No. 829-001-00188-4.) $2.25.

Miami—Hialeah, Florida, Metropolitan Area, October 1987. Bulletin 3040-42, 49 pp. (GPO Stock No. 829-001-00185-0.) $2.75.

St. Cloud, Minnesota, Metropolitan Area, October 1987. Bulletin 3040-47, 48 pp. (GPO Stock No. 829-001-00190-1.) $2.25.

Seattle, Washington, Metropolitan Area, November 1987. Bulletin 3040-46, 28 pp. (GPO Stock No. 829-001-00189-2.) $1.50.

Periodicals

CPI Detailed Report. Each issue provides a comprehensive report on price movements for the month, plus statistical tables, charts, and technical notes. $6 ($16 per year).

Current Wage Developments. Each issue includes selected wage and benefit changes, work stoppages, and statistics on compensation changes. $2.75 ($12 per year).

Employment and Earnings. Each issue covers employment and unemployment developments in the month, plus statistical tables on national, State, and area employment, hours, and earnings. $8.50 ($22 per year).

Occupational Outlook Quarterly. Each issue helps people planning careers, guidance counselors, and others keep informed of changing career opportunities. $2 ($5 per year).

Producer Price Indexes. Each issue includes a comprehensive report on price movements for the month, plus regular tables and technical notes. $8.50 ($21 per year).

Other Publications

(Single copies available upon request while supplies last.)

Area Wage Summaries

Albany-Schenectady-Troy, NY, September 1987. 7 pp.
Las Vegas-Tonopah, NV, October 1987. 6 pp.
McAllen-Edinburg-Mission and Brownsville-Harlingen, TX, October 1987. 4 pp.
Mansfield, OH, November 1987. 6 pp.

New Hampshire, September 1987. 7 pp.
Northwest Texas, September 1987. 6 pp.
Puerto Rico, September 1987. 7 pp.
Reno, NV, November 1987. 4 pp.
Tucson-Douglas, AZ, September 1987. 4 pp.

BLS Reports

Employment in Perspective: Minority Workers, Third Quarter 1987. Report 746, 4 pp. Focuses on the racial and ethnic disparities in the proportion of the population who did not work at all in 1986.

Employment in Perspective: Women in the Labor Force, Third Quarter 1987. Report 747, 3 pp. Focuses on employment problems of adult women who never graduated from high school.

BLS Summaries

Business Contracting-Out Practices. Summary 87-88. 8 pp.

To Order:

Sales publications. Order bulletins by title, bulletin number, and GPO stock number from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, or from the Bureau of Labor Statistics, Publications Sales Center, P.O. Box 2145, Chicago, IL 60690. Subscriptions, including microfiche subscriptions, are available only from the Superintendent of Documents. All checks—including those that go to the Chicago Regional Office—should be made payable to the Superintendent of Documents.

Other publications: Request from the Bureau of Labor Statistics, U.S. Department of Labor, Room 2831A, 441 G Street, NW, Washington, DC 20212, or from the Bureau of Labor Statistics, Chicago Regional Office, P.O. Box 2145, Chicago, IL 60690.

Employment and Wages Annual Averages 1986

U.S. Department of Labor
Bureau of Labor Statistics
Bulletin 2297

A comprehensive portrait
of American business by State

Data available
- Number of reporting units, employment, total annual wages, and average weekly wages for 1,005 industries

Coverage
- 99 percent of American wage and salary workers

Source of data
- Quarterly tax reports submitted to State agencies by employers subject to unemployment insurance laws

Uses
- Marketing research and analysis
- Economic forecasting
- Business investment decisions
- Government policymaking and regulation

Publications are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, or the Bureau of Labor Statistics, Publications Sales Center P.O. Box 2145 Chicago, IL. 60690

Order Form

Please send ____ copies of *Employment and Wages, Annual Averages 1986,* Bulletin 2297, Stock No. 029-001-02940-3, $25 each, for a total of $ _____

☐ Enclosed is a check or money order payable to Superintendent of Documents.

☐ Charge to GPO deposit account no. _____ Order No. _____

☐ Charge to ☐ VISA ☐ MasterCard

Credit Card No. _____ Expiration date _____

Total charge $ _____

Name _____

Address _____

City, State, Zip Code _____

U.S. Department of Labor
Bureau of Labor Statistics
Washington, D.C. 20212

Official Business
Penalty for private use, $300

Second-Class Mail
Postage and Fees Paid
U.S. Department of Labor
ISSN 0095-926X

United States Department of Labor 75 Years of Working for America's Future