

## Real compensation, 1979 to 2003: analysis from several data sources

*The National Compensation Survey, the Current Employment Statistics survey, the Quarterly Census of Employment and Wages, the Current Population Survey, and the real hourly compensation series from the BLS productivity statistics program each offer strengths and limitations in analyzing real compensation*

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Increases in employee compensation substantially outpaced increases in consumer prices during the late 1990s. Most, but not all, data series indicate that real compensation continued to grow from 2000 to 2003, although at a somewhat slower rate than in the late 1990s. Changes in compensation—or, more specifically, changes in “real” compensation after accounting for consumer price inflation—are among the most widely watched indicators of economic performance. Most workers are keenly aware of how much they are paid. At a macroeconomic level, growth in real compensation is vital because it determines how much people will have available to spend and save. Spending and saving, in turn, drive the hiring and investment decisions of firms.

“What’s going on with real earnings?” can be somewhat difficult to answer because there is a wealth of data from many different sources, and those sources do not always indicate the same trends. It can be difficult to decide which source is most appropriate for a particular purpose. At least eight statistical programs at the Bureau of Labor Statistics (BLS) provide information on compensation, and a number of other government and private sources also collect compensation information.<sup>1</sup> This article examines data from five BLS statistical programs that are the best suited for providing information on recent and longer-term trends in compensation. These data

sources are the National Compensation Survey, the Current Employment Statistics survey, the Quarterly Census of Employment and Wages, the Current Population Survey, and the real hourly compensation series from the BLS productivity statistics program. (See exhibit 1.)

### Adjusting for inflation

To compare trends in different compensation series, it is important to use the same measure of price change to adjust each series for consumer price inflation. That way, differences in compensation trends will not be confused with differences in the price measures used to adjust the compensation series. If the sole objective is to compare trends in different compensation series, it would not be necessary to adjust the series for inflation. Instead, the “current dollar” changes in each series could be compared over time. Adjusting each compensation series for inflation is important, however, because the rate of change in real compensation is a significant gauge of changes in living standards. Thus, it is important not just to use the same measure of price change to adjust each compensation series, but to use the measure that most accurately reflects changes in the prices of goods and services that consumers purchase.

The BLS Consumer Price Index program publishes a variety of price indexes; the two best

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<b>Exhibit 1. Comparing five BLS sources of compensation data</b>					
<b>Data characteristics</b>	<b>Employment Cost Index of the National Compensation Survey</b>	<b>Hourly and weekly earnings from the Current Employment Statistics survey</b>	<b>Annual and weekly earnings from the Quarterly Census of Employment and Wages</b>	<b>Usual weekly earnings from the Current Population Survey</b>	<b>Real hourly compensation in nonfarm business sector</b>
<b>Timeliness and respondent characteristics</b>					
How frequently is the information published? .....	Less than a month after the end of each quarter	Monthly within 3 weeks of the survey reference period	Weekly wages reported quarterly and annual wages reported annually; both published with a lag of about 6 months	Less than a month after the end of each quarter	About a month after the end of each quarter
Who provides information? .....	Nonfarm establishments	Nonfarm establishments	All nonfarm and agricultural establishments covered by Federal or State unemployment insurance programs	Households	Nonfarm establishments, households, and government administrative records
Private households included? .....	No	No	No	Yes	No
Nonprofit organizations included? .....	Yes	Yes	Some	Yes	No
Government employees included? .....	State and local only	No	Federal, State, and local	Federal, State, and local	Only those in government enterprises
Number of units? .....	8,300 private establishments and 800 government establishments <sup>1</sup>	About 350,000 private-sector establishments	More than 8 million private and government establishments	60,000 households	Not applicable
<b>Worker, job, and employer characteristics</b>					
All occupations included? .....	Yes	No, workers in nonproduction occupations and supervisors are excluded	Yes	Yes	Yes
Estimates available by occupation? .....	Yes	No	No	Yes	No
Full- and part-time distinctions possible? .....	Yes <sup>2</sup>	No	No	Yes	No
Demographic information available? .....	No	No	No	Yes	No
Estimates available by industry? .....	Yes	Yes	Yes	Yes	Some
Collective bargaining status available? .....	Yes	No	No	Yes	No
Self-employed business owners included? .....	No	No	No	No	Yes
<b>Selected forms of compensation included</b>					
Wages and salaries before taxes and other deductions? .....	Yes	Yes	Yes	Yes	Yes
Employer 401(k) contributions? .....	Yes	No	Yes, in some States	No	Yes
Stock options .....	No	No	Yes	No	Yes
Employer costs for other benefits? .....	Yes	No	No	No	Yes
Characteristics of benefits plans? .....	Yes	No	No	No	No
Commissions? .....	Yes	Yes, if earned and paid at least monthly	Yes	Yes, if usual	Yes
Tips? .....	No	No	Yes	Yes, if usual	Yes
Bonuses? .....	Yes	Yes, if earned and paid each pay period	Yes	Yes, if usual	Yes
Cash value of meals and other payments in kind? .....	No	No	Yes, in most States	No	Yes

<sup>1</sup> The number of sampled establishments shown includes only the establishments included in the Employment Cost Index component of the National Compensation Survey. The total number of establishments in the National Compensation Survey sample is more than 22,000.

<sup>2</sup> Although the National Compensation Survey collects information about workers' full- or part-time status, BLS does not estimate Employment Cost Indexes for full- and part-time workers separately.

known to users of economic statistics are the Consumer Price Index for All Urban Consumers (CPI-U) and the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W).<sup>2</sup> These series have undergone many methodological improvements over the years, making present and future statistics more accurate. The historical statistics are not revised to reflect these improvements, however. Adjustments to Federal income tax brackets, Social Security benefits, wage levels specified in collective bargaining agreements, and many other government programs and private contracts are tied to the CPI-U or CPI-W, so revising the historical series could have far-ranging implications.

Many users of statistics find it important to have price measures that are consistent over time to distinguish between changes in measurement procedures and changes in actual price levels paid by consumers. For this reason, BLS has developed a research series, called the Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS), that provides estimates of what measured inflation would have been from 1978 to the present if methods currently used in calculating the CPI-U had been used since 1978.<sup>3</sup> Some of the improvements reflected in the CPI-U-RS would have raised measured inflation over the 1978–2003 period, but the net effect of all the changes would have been to lower measured inflation. From December 1977 to December 2003, the CPI-U increased 196.8 percent and the CPI-W increased 187.8 percent. By comparison, the CPI-U-RS increased 168.4 percent.

Obviously, the conclusions that can be drawn about trends in real compensation can be affected significantly by the choice of which price index is used to adjust for inflation. In this article, the CPI-U-RS will be used to adjust all compensation series.

## National Compensation Survey

The National Compensation Survey (NCS) is a very comprehensive source of information on compensation. The survey employs BLS economists to collect detailed information on wages and salaries, as well as benefits. Most other data sources obtain little or no information about benefits. The survey includes workers in nonfarm business establishments and in State and local governments but excludes workers in the Federal government, agriculture, and private households (such as nannies). Also excluded are workers who are able to set their own compensation, such as self-employed business owners. The survey provides detailed information on pay and benefits by industry, occupation, establishment size, region and metropolitan area, full- or part-time status, and whether a worker is covered by a collective bargaining agreement.

Wages and salaries are defined in the survey as the hourly straight-time wage rate or, for workers not paid on an hourly basis, straight-time earnings divided by the corresponding

hours. Straight-time wage and salary earnings are total earnings before payroll deductions, such as for income taxes and employee contributions for employer-provided or legally required benefit plans. Straight-time wage and salary earnings include production bonuses, incentive earnings, commission payments, and cost-of-living adjustments. Straight-time earnings do not include premium pay for overtime and for work on weekends and holidays, shift differentials, and nonproduction bonuses, such as lump-sum payments provided in lieu of wage increases. These types of pay are included as benefit costs in the survey.

The benefits information obtained from the survey includes the percent of workers participating in each type of benefit program, the detailed provisions of each benefit program, employers' costs for providing each type of benefit, and whether participating employees must contribute toward the cost of a benefit plan. The survey obtains information on the following benefits categories:

- *Paid leave:* vacations, holidays, sick leave, and other leave
- *Supplemental pay:* premium pay for work in addition to the regular work schedule (such as overtime, weekends, and holidays), shift differentials, and nonproduction bonuses (such as referral bonuses and lump-sum payments provided in lieu of wage increases)
- *Insurance benefits:* health, life, and short- and long-term disability
- *Retirement and savings benefits:* defined-benefit and defined-contribution plans
- *Legally required benefits:* Social Security, Medicare, Federal and State unemployment insurance, and workers' compensation
- *Other benefits:* severance pay and supplemental unemployment plans

One set of statistical series produced from the NCS is the Employment Cost Index (ECI), which provides measures of change in employers' costs for wages and salaries and benefits. The data are released each quarter, although the reference period is not actually the entire quarter; rather, it is the pay period that includes the 12th day of the survey months of March, June, September, and December.

An important difference between the ECI and the other measures of compensation examined in this article is that the ECI measures changes in employment costs that are free from the influence of employment shifts among occupations and industries. Levels of compensation differ across occupations and industries. When the shares of employment in occupations and industries shift over time, these changes can affect overall average compensation levels, even if average compensation within the occupations and industries did not change. For example, an employment shift from industries

with higher pay to those with lower pay would tend to reduce the overall average pay level. From March 1986 to December 1994, ECI held the occupation and industry shares constant at 1980 levels. Since March 1995, the ECI has held the occupation and industry employment shares constant at 1990 levels. The other compensation data sources examined in this article are affected not just by changes in compensation levels within occupations and industries, but also by employment shifts across occupations and industries.<sup>4</sup>

In addition to the ECI for total compensation series, indexes are available to measure changes in wages and salaries and in benefits costs. The ability to distinguish between wages and salaries and benefits is important because benefits composed 28 percent of private-sector employers' total compensation costs at the end of 2003, indicating that benefits are not the "fringe" that they often have been called. (See table 1.)

Employers' costs for wages and salaries often move at very different rates than benefits costs. For example, in the 12 months ended December 2003, the ECI for private-sector wages and salaries rose 3.0 percent in current dollars, while the ECI for private-sector benefits rose 6.4 percent. Over the same time period, prices as measured by the CPI-U-RS increased 1.9 percent. From 2000 to 2003, employers' costs for benefits rose considerably faster than wages and salaries. From 1995 to 1999, wages and salaries generally rose at a faster rate than employers' benefits costs.

Inflation-adjusted costs for total compensation generally have increased, with a few exceptions.<sup>5</sup> (See chart 1.) During the period of labor market weakness and high inflation in 1980, real total compensation costs generally declined, as they did during 1987 and during the 1990–91 recession. Real compensation costs increased moderately during 1992, 1993, and 1994 as the recovery from the 1990–91 recession began to take hold, but real compensation essentially flattened from 1995 until the middle of 1997. In the second half of 1997, real compensation costs began growing and continued to increase in the years that followed, with substantial increases occurring in 1998 and again in 2001–03.

Trends in the wage and salary component of real compensation follow a similar pattern as trends in total compensation. Declines in real wages and salaries were somewhat more prolonged and substantial during the recessions of the early 1980s and from 1987 until the end of the 1990–91 recession. Real wages and salaries grew moderately from 1992 through 1996. Real wage and salary growth accelerated in 1997 and was very strong in 1998 before moderating in the second half of 1999. The rate of growth remained positive in 2000 and even accelerated in the recession year of 2001 and in 2002 before moderating somewhat in 2003.

Trends in employers' costs for benefits indicate that, with rare exceptions, the real cost of benefits has risen substantially throughout most of the 1980–2003 period. The real

**Table 1. Private-sector employer costs per hour worked for employee compensation (in current dollars) and costs as a percent of total compensation, December 2003**

Compensation component	Cost	Percent
Total compensation .....	\$22.92	100.0
Wages and salaries .....	16.49	71.9
Total benefits .....	6.43	28.1
Paid leave .....	1.48	6.5
Vacation .....	.74	3.2
Holiday .....	.51	2.2
Sick .....	.18	.8
Other .....	.06	.3
Supplemental pay .....	.64	2.8
Premium <sup>1</sup> .....	.24	1.0
Shift differentials .....	.06	.3
Nonproduction bonuses .....	.34	1.5
Insurance .....	1.62	7.1
Life .....	.04	.2
Health .....	1.50	6.5
Short-term disability .....	.05	.2
Long-term disability .....	.03	.1
Retirement and savings .....	.70	3.1
Defined benefit .....	.28	1.2
Defined contribution .....	.42	1.8
Legally required benefits .....	1.96	8.6
Social Security and Medicare .....	1.38	6.0
Social Security .....	1.11	4.8
Medicare .....	.27	1.2
Federal unemployment insurance .....	.03	.1
State unemployment insurance .....	.11	.5
Workers' compensation .....	.43	1.9
Other benefits <sup>2</sup> .....	.03	.1

<sup>1</sup> Includes premium pay for work in addition to the regular work schedule (such as overtime, weekends, and holidays).

<sup>2</sup> Includes severance pay and supplemental unemployment benefits.

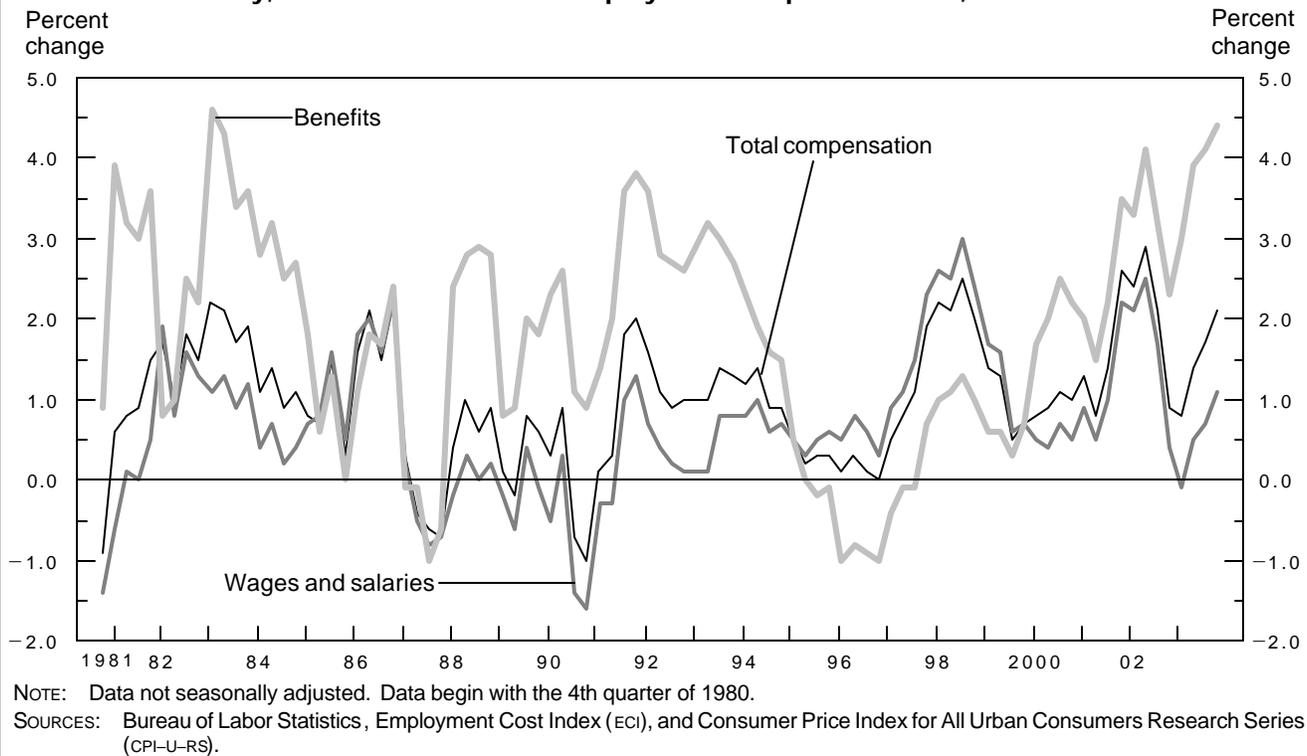
SOURCE: Bureau of Labor Statistics, National Compensation Survey.

cost of benefits declined during 1987 and again from 1995 to 1997. In all other periods, real benefits costs have risen. The real cost of benefits increased especially rapidly in 2002 and 2003.

*A closer look at benefits costs.* Legally required benefits, including Social Security, Medicare, unemployment insurance, and workers' compensation, compose the largest share of employers' costs among the major benefits categories. In December 2003, private-sector employers' contributions to these Federal or State government-run benefits programs made up 8.6 percent of compensation costs; that share had fallen from a peak of 9.4 percent in March 1994.

Paid leave and health insurance benefits also compose large shares of employers' total compensation costs, with each type of benefit accounting for 6.5 percent of the total cost in December 2003. Increases in health insurance costs have received considerable attention in recent years from both employers and workers. From December 2002 to December

**Chart 1. Percent change from four quarters earlier in inflation-adjusted total compensation, wage and salary, and benefits costs for employers in the private sector, 1980–2003**



2003, the Employment Cost Index for private-sector health insurance rose 10.5 percent (not adjusted for consumer price inflation). In the prior year, employers' health insurance costs rose 10.2 percent.<sup>6</sup> These increases occurred even as employers tried to control health insurance costs by passing some costs on to their employees.

In addition to the numerous ECI series and the information shown in table 1 on employers' compensation costs expressed in dollars per hour worked, the National Compensation Survey also provides information on the characteristics of employee benefits plans. For health insurance, these characteristics include the proportion of workers who participate in plans, the services for which the plans pay, and workers' costs for plan premiums, copayments, coinsurance, and deductibles. In 2003, 65 percent of full-time workers in the private sector participated in an employer-provided health plan. Among part-time workers, 13 percent had employer-provided health coverage in 2003.

Among workers with health coverage, 90 percent had to contribute some share of the cost of premiums for family coverage in 2003, up from 81 percent in 1999. For single coverage, 78 percent of workers had to contribute toward the cost of premiums in 2003, up from 67 percent in 1999. The premiums themselves also increased. The average monthly pre-

mium that plan participants contributed for family coverage was \$229 in 2003, compared with \$180 in 2000 and \$170 in 1999. Workers' share of the premium costs for employee-only coverage also rose, to more than \$60 per month in 2003, compared with \$54 in 2000 and \$48 in 1999. As workers bear a larger share of healthcare costs, those increases eat into workers' wage and salary compensation, somewhat offsetting their pay increases.

Employers' costs for defined-benefit pensions also increased rapidly in 2003. Employers are required to update their actuarial calculations periodically to ensure that defined-benefit plan assets are adequate to fund current and future plan payments. Plan assets grew rapidly in the middle to late 1990s as the stock market continued to rise, so employers often did not need to contribute funds to defined-benefit pension plans. Stock prices generally fell from April 2000 to February 2003, and interest rates on bonds and other investments remained low, requiring employers to contribute more funding to defined-benefit plans in 2003 to meet actuarial requirements. The effect of increases in defined-benefit pension costs is somewhat mitigated by the fact that only one-fifth of private-sector workers participated in defined-benefit pension plans in 2003. By comparison, two-fifths of private-sector workers participated in defined-contribution plans.

## Current Employment Statistics survey

The Current Employment Statistics (CES) survey includes a sample of 400,000 nonfarm establishments in the private sector and in Federal, State, and local governments. The survey is the source of the monthly nonfarm payroll employment figures that are closely watched by observers of the labor market and financial markets. The survey also obtains information on the employment, hours, and earnings of a subcategory of workers in the private sector called “production or nonsupervisory” workers. The hours measure refers to the average weekly hours for which workers are paid, including paid time off for vacations, holidays, and sick leave. The earnings estimates available from the survey are for average hourly and average weekly earnings. Information on earnings in current dollars is included in the monthly BLS Employment Situation report. Later each month, BLS issues a separate report on “Real Earnings” on the same day that the Consumer Price Index report is released. Earnings information for private-sector workers is available from the CES survey back to 1964. Estimates are updated monthly within 3 weeks of the survey reference period (the pay period that includes the 12th day of each month), making the survey the most timely source of information on compensation.

Although estimates from the survey are available monthly, quarterly averages are analyzed in this article to make it easier to compare them with other BLS data series, which are only available quarterly.<sup>7</sup> The CES earnings estimates examined in this article also differ from the official estimates published in the monthly Real Earnings report because the estimates in the monthly report are adjusted for inflation using the CPI-W. As stated previously, the CPI-U-RS is used in this article to adjust all compensation series for inflation.

Trends in the percent change from four quarters earlier in the real average hourly and weekly earnings of production or nonsupervisory workers in the private nonfarm sector from 1980 to 2003 track each other fairly closely, although not perfectly, because of changes over time in average weekly hours.<sup>8</sup> (See chart 2.) Real hourly and weekly earnings declined sharply during 1980–82, a period in which two recessions occurred and consumer prices increased rapidly. Real hourly earnings changed little in 1983 and 1984, although real weekly earnings rose moderately as the economy began to grow rapidly and consumer price increases eased considerably. In 1985, real hourly and weekly earnings declined somewhat before showing slight increases during 1986. From 1987 through the 1990–91 recession, real earnings again declined. Real hourly and weekly earnings increased slightly from 1992 through 1996. Real earnings began growing more rapidly in 1997 and 1998 and continued to grow at a somewhat slower pace in 1999 and 2000. Real hourly earnings grew moderately in the recession year of 2001, but weekly earnings

changed little. In 2002, real hourly and weekly earnings grew moderately, and both series showed little change in 2003.

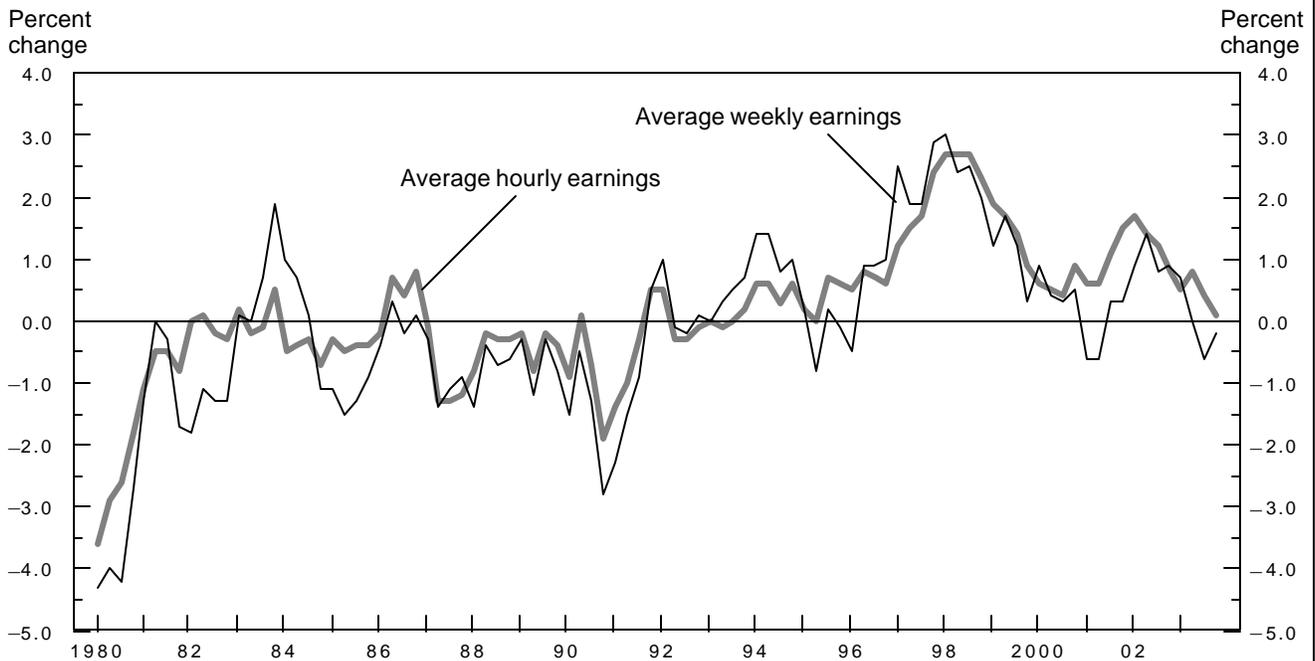
The real hourly and weekly earnings series from the CES survey are closely watched by observers of labor and financial markets. The timeliness of the data makes them particularly useful for quickly observing changes in earnings trends. Users should be aware of some characteristics of the series. First, unlike the ECI, the CES data do not include employers’ costs for benefits. The CES earnings data also do not include commissions if they are not earned and paid at least monthly and bonuses if they are not earned and paid each pay period. The survey also does not include tips.

The CES survey does not distinguish between the earnings of full- and part-time workers, and separate earnings estimates for these categories are not available. The scope of the hours and earnings estimates is “production or nonsupervisory” workers. This term refers to production and related workers in manufacturing and in natural resources and mining, construction workers in the construction industry, and nonsupervisory workers in private service-providing industries.<sup>9</sup> Production or nonsupervisory workers accounted for 81 percent of total private-sector employment in 2003, a proportion that has fluctuated only slightly since 1979. (See table 2.) Nearly one-fifth of workers are excluded from the earnings series, but the proportion varies by industries. For example, 70 percent of workers in manufacturing were in production and related jobs in 2003, down from 74 percent in 1979. In education and health services, 88 percent of workers were included in the nonsupervisory category in 2003, down from 91 percent in 1979.

Users of earnings data from the survey should be aware that some employers may not include the same workers in the production or nonsupervisory category that the survey instructions indicate. There is evidence from prior research that some respondents instead report the employment levels, hours, and payrolls of hourly-paid workers or workers who are covered by the Fair Labor Standards Act, the Federal law that established the minimum wage rate and rules regarding overtime.<sup>10</sup> It is not clear why some establishments include different groups of workers in the production or nonsupervisory category than the survey instructions indicate, but it is worthwhile to consider the data-collection procedures used in the CES survey.

When an establishment is added to the survey sample, a professional interviewer contacts the establishment by telephone and interviews a staff member who is knowledgeable about the establishment’s employment, hours, and payroll and is authorized to provide the relevant information. The professional interviewer trains the staff member about measurement concepts used in the CES survey and conducts a computer-assisted interview in which the staff member provides information about the establishment’s employment, hours, and payroll.

**Chart 2. Percent change from four quarters earlier in inflation-adjusted average hourly and weekly earnings of production or nonsupervisory workers on private nonfarm payrolls, 1980–2003**



NOTE: Data not seasonally adjusted.

SOURCES: Bureau of Labor Statistics, Current Employment Statistics (CES) survey, and Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS).

**Table 2. Production or nonsupervisory employees as a percent of total employment, annual averages, 1979 to 2003**

Year	Total private	Natural resources and mining	Construction	Manufacturing	Trade, transportation, and utilities	Information	Financial activities	Professional and business services	Education and health services	Leisure and hospitality	Other services
1979 .....	81.8	73.1	82.4	74.4	86.6	69.5	79.0	82.0	91.0	87.0	83.8
1980 .....	81.4	72.9	81.3	73.0	86.4	68.9	78.7	82.1	91.1	87.0	84.1
1981 .....	81.2	73.0	80.6	72.4	86.0	68.6	78.5	82.2	91.0	86.9	84.3
1982 .....	80.7	71.7	79.7	70.9	85.7	67.5	77.8	81.8	90.6	86.9	84.1
1983 .....	80.8	70.0	79.7	71.1	85.7	66.7	77.4	81.9	90.5	87.0	84.1
1984 .....	80.8	70.4	80.3	71.5	85.5	68.0	77.2	81.7	89.9	86.7	83.9
1985 .....	80.8	70.4	80.7	71.0	85.5	68.1	77.0	81.8	89.8	86.6	84.0
1986 .....	80.8	69.6	80.7	70.9	85.4	68.0	76.7	81.8	89.5	86.6	83.9
1987 .....	80.9	70.2	80.3	71.2	85.4	68.5	76.1	81.8	89.2	86.5	83.9
1988 .....	80.9	70.8	80.2	71.3	85.4	68.7	75.3	81.8	89.0	86.4	84.0
1989 .....	81.0	70.1	80.2	71.2	85.4	68.9	75.1	81.9	88.8	86.4	84.0
1990 .....	80.9	70.3	78.2	71.6	84.0	69.4	75.2	81.9	88.7	89.4	83.4
1991 .....	80.7	69.7	76.9	71.3	83.7	69.9	74.9	81.7	88.8	89.1	83.3
1992 .....	80.9	69.4	77.0	71.6	83.6	70.8	75.0	81.8	88.8	89.1	83.2
1993 .....	81.2	69.4	77.5	72.0	83.8	71.1	75.4	82.2	88.7	89.1	83.3
1994 .....	81.4	70.0	78.0	72.6	83.8	70.4	75.5	82.8	88.5	88.9	83.3
1995 .....	81.6	71.5	78.0	72.9	83.8	70.6	75.7	82.9	88.5	88.8	83.4
1996 .....	81.6	72.4	78.1	72.7	83.9	71.3	75.7	82.9	88.6	88.8	83.3
1997 .....	81.6	73.2	78.2	72.8	83.8	70.7	75.4	83.0	88.6	88.8	83.2
1998 .....	81.4	73.3	78.2	72.5	83.6	68.9	75.1	83.0	88.5	88.6	82.9
1999 .....	81.4	73.2	78.0	72.3	83.7	68.8	74.9	82.6	88.5	88.5	82.9
2000 .....	81.4	74.5	78.0	72.0	83.8	68.9	74.6	82.7	88.4	88.7	83.1
2001 .....	81.3	75.4	78.1	71.0	83.6	69.7	74.4	82.5	88.5	88.6	83.2
2002 .....	81.2	74.8	77.4	70.6	83.7	70.6	74.8	81.7	88.3	88.2	82.8
2003 .....	80.9	73.4	76.0	70.2	83.3	73.6	74.8	80.8	87.6	87.6	81.9

SOURCE: Bureau of Labor Statistics, Current Employment Statistics survey.

After several months of such interviews, most establishments are moved to one of the self-reporting data-collection modes used in the survey, including touchtone telephone data entry, electronic data interchange (in which large, multie-establishment firms provide an electronic file to BLS each month in a prescribed format), the Internet, fax, and mail. About three-fourths of responding establishments complete the brief survey form each month generally without the assistance of interviewers, although a help desk is available each business day to assist respondents. Even surveys such as the Current Population Survey (described later) that employ professional interviewers to collect data from all respondents are subject to response error. It is therefore unlikely that the self-reporting methods used by most CES survey respondents result in any greater response error, given the procedures used to train respondents and answer their questions and the relative straightforwardness of the CES survey.

It is possible that, even in cases in which responding establishments follow the CES survey instructions carefully, some still may have difficulty reporting the employment levels, hours, and payrolls of production or nonsupervisory workers because the measurement concepts might not align with record-keeping practices at the establishment. Again, however, this is a potential problem with all surveys and administrative databases and is not unique to the CES survey.

Research is underway at BLS to make the hours and earnings series from the survey more accurate and relevant. BLS currently plans to begin publishing data in 2006 on weekly hours, hourly and weekly earnings, and gross monthly earnings for all workers, rather than just production or nonsupervisory workers. BLS also plans to begin collecting information on commissions. After the hours and earnings series for all employees become well established and there is sufficient history to adjust the estimates for seasonal variation, BLS plans to drop the hours and earnings series for production or nonsupervisory workers in 2009 and collect data only for all employees.<sup>11</sup>

## Quarterly Census of Employment and Wages

The Quarterly Census of Employment and Wages (QCEW), perhaps better known to long-time users of economic statistics as the ES-202 program, is an administrative database of employers and workers covered by the State and Federal unemployment insurance laws. The QCEW program originated with the establishment of the national unemployment insurance system in 1938, making it one of the oldest sources of employment and earnings information available for the United States. Earnings data from the QCEW program are not completely comparable over time, however, because coverage under unemployment insurance laws has expanded considerably since the 1930s. In 1938, unemployment insur-

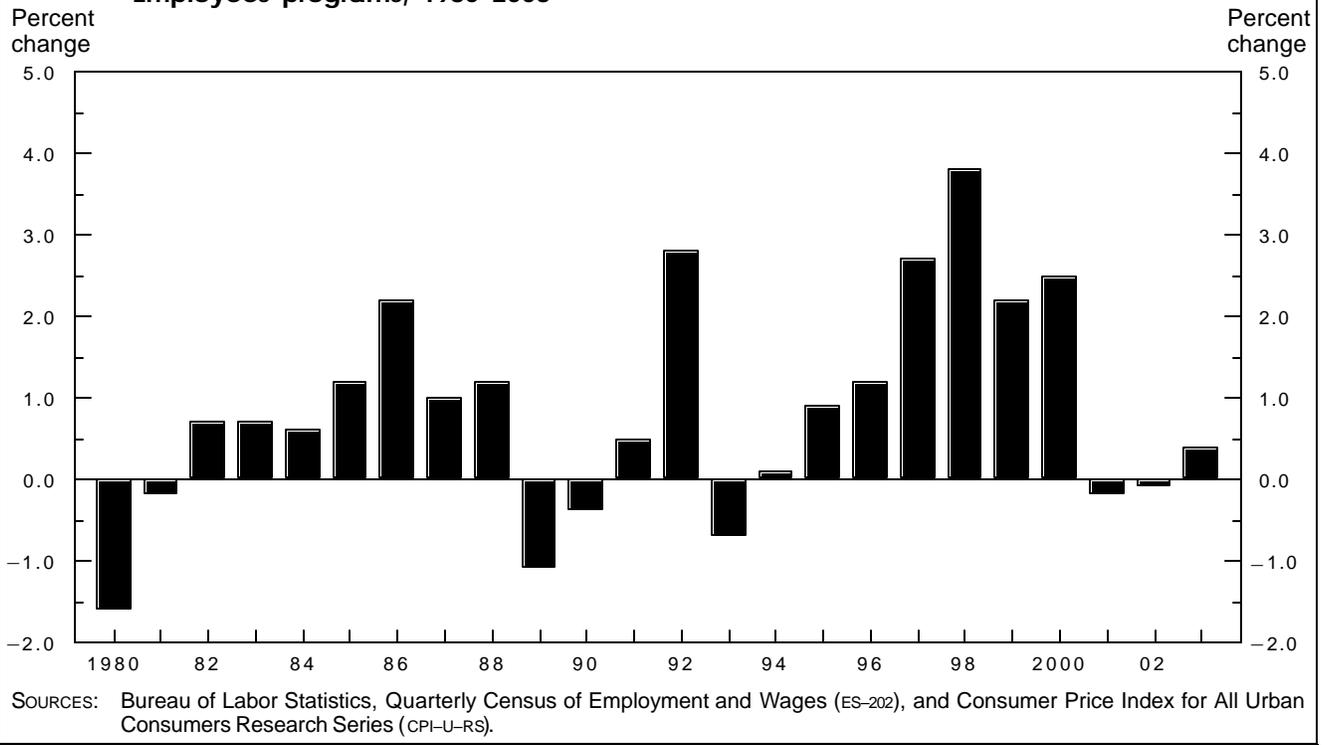
ance coverage, and thus QCEW reporting requirements, applied only to private-sector firms that employed eight or more workers for at least 20 weeks a year. Today, nearly all wage and salary workers in the private nonfarm sector are covered by State or Federal unemployment insurance programs, as are most workers in government and nearly half of workers in agriculture. The last major expansion of unemployment insurance coverage occurred in 1978, so a fairly comparable data series on earnings is available over a period of more than two decades.<sup>12</sup>

Average annual and weekly wages are available from the QCEW.<sup>13</sup> Average annual wages are calculated by dividing an establishment's total annual wages paid by the establishment's annual average employment. Average weekly wages are calculated by dividing annual average wages by 52. There is little difference between examining annual or weekly earnings because the two series follow identical trends. This article focuses on annual wages.

The QCEW series on inflation-adjusted earnings shows somewhat different trends than do the ECI and CES survey series. Inflation-adjusted annual wages declined during the recession and high-inflation years of 1980 and 1981, but the declines were not as sharp as those indicated by the CES survey. (See chart 3.) Annual wages, as measured by the QCEW, rose after adjustment for inflation every year from 1982 to 1988. Real annual wages then declined in 1989 and the recession year of 1990 before growing slightly in 1991. Real annual wages grew fairly rapidly in 1992 and then declined slightly in 1993. Real annual wages grew only slightly in 1994 but then grew more substantially every year from 1995 to 2000. Annual wage growth was strongest in 1998, similar to the patterns shown by the ECI and the CES survey. Real annual wages declined slightly in the recession year of 2001 and in 2002, in contrast to the increases seen in the ECI and CES surveys for those years. Real annual wages rose somewhat in 2003.

One advantage of using the QCEW to analyze trends in employment and earnings is that the database is a complete census of workers covered by unemployment insurance laws; therefore, statistics derived from the database have no sampling error.<sup>14</sup> The other sources of earnings information described in this article are sample surveys, and estimates derived from those surveys are subject to sampling error—that is, the difference that occurs by chance between a statistic computed from a sample and a statistic computed from the complete population. The sample sizes for BLS surveys are fairly large, so the level of sampling error is relatively small for overall estimates derived from a survey. Survey estimates for detailed industries, occupations, geographic areas, and other categories may be based on relatively few sample observations, so sampling errors can be relatively large for such estimates. The QCEW is an excellent source of employment

**Chart 3. Percent change from previous year in inflation-adjusted average annual wages for workers covered by State unemployment insurance or Unemployment Compensation for Federal Employees programs, 1980–2003**



and earnings information for detailed industries and geographic areas, as well as establishment size.

The QCEW earnings information is very comprehensive and includes not just wages and salaries, but also pay for vacations and other paid leave, commissions, tips, bonuses, stock options, and the cash value of payments in kind, such as free meals or lodging. The QCEW data generally do not include employer costs for legally required or employer-provided benefits, although employer payments to 401(k) retirement plans are reported in some States. The QCEW data are an important source of macroeconomic information; the U.S. Department of Commerce uses the data to estimate a large part of the wage and salary component of national income and personal income.

There also are disadvantages to using QCEW data to track trends in employment and earnings. The main disadvantage is timeliness. Until 2001, BLS released annual average employment and wage data from the QCEW program once per year, about 10 months after the end of each calendar year. Timeliness improved markedly in October 2002, when the QCEW program began releasing data each quarter on employment and average weekly wages. There remains a lag of about two quarters in the release of QCEW data, however. The QCEW also does not provide any occupational detail, nor does

it distinguish between full- and part-time workers or full- and part-year workers.

### Current Population Survey

The earnings series discussed so far in this article all obtain information from employers. The Current Population Survey (CPS), in contrast, obtains earnings information from workers or members of their households. The CPS is a monthly survey of 60,000 U.S. households and is the source of the information on the Nation's unemployment rate. The CPS collects information on employment, job-search activities of people without jobs, age, sex, race, ethnicity, marital status, presence and ages of children in the household, educational attainment, occupations, industries, full- and part-time work, union membership, earnings, and a variety of other characteristics of workers and their jobs.

Questions about the earnings of wage and salary workers are asked each month of one-quarter of the households in the sample, and BLS publishes quarterly and annual average estimates of usual weekly earnings from the CPS.<sup>15</sup> BLS also publishes estimates of hourly earnings, but only for workers paid hourly rates.<sup>16</sup> Wage and salary workers are those who are paid wages, salaries, commissions, tips, payments in kind, or

piece rates. Information about the weekly earnings of self-employed workers is not available from the CPS. The survey asks respondents to provide information on earnings before taxes and other deductions and to include any overtime pay, commissions, or tips that the worker *usually* receives.<sup>17</sup> For multiple jobholders, the questions ask about usual earnings at the main job. The term “usual earnings” is as perceived by the respondent. If the respondent asks for a definition of usual, interviewers are instructed to define the term as more than half the weeks worked during the past 4 or 5 months.

BLS publishes CPS estimates of usual weekly earnings for full-time and part-time workers separately. Full-time workers are defined in the CPS as those who usually work 35 hours or more per week at their sole or principal job.<sup>18</sup> This definition differs from the one used in the National Compensation Survey, in which each responding establishment defines full- or part-time employment according to its own policies and practices.

As with the other earnings series examined in this article, the inflation-adjusted median usual weekly earnings of full-time wage and salary workers fell substantially during 1980 and 1981, years marked by recessions and high consumer price inflation. (See chart 4.) The median is the amount that divides an earnings distribution into two equal groups, one having earnings at or above the median and the other having earnings at or below the median. Real median weekly earnings rose somewhat in 1982 before dipping slightly in 1983 and 1984. Real median weekly earnings increased substantially during 1985, 1986, and 1987 before declining again from 1988 through the first half of 1991. Moderate earnings growth resumed during 1992, 1993, and the first half of 1994, and earnings then went through alternating periods of brief small declines and increases through 1996. Real median weekly earnings grew slightly in 1997, and, similar to the other data sources discussed in this article, earnings growth accelerated in 1998. Real median weekly earnings continued to rise in 1999 and most of 2000 before declining slightly in late 2000 and early 2001. In contrast with prior recessions, real median weekly earnings rose somewhat during the 2001 recession and into 2002. Real median weekly earnings declined somewhat in the second half of 2002 and the first half of 2003 and remained essentially flat in the second half of 2003.

The trend in overall median usual weekly earnings for full-time wage and salary workers masks divergent trends in the earnings of women and men. Chart 4 also shows that, among full-time wage and salary workers, gains in earnings for women outpaced the gains in men’s earnings throughout most of the period from 1980 to 2003. In addition, there have been several periods during which the real median weekly earnings of men declined, while women’s earnings continued to rise. This pattern occurred most recently in the sec-

ond half of 2002 and early 2003. In the second half of 2003, real earnings for men grew slightly, while women’s earnings grew more strongly.

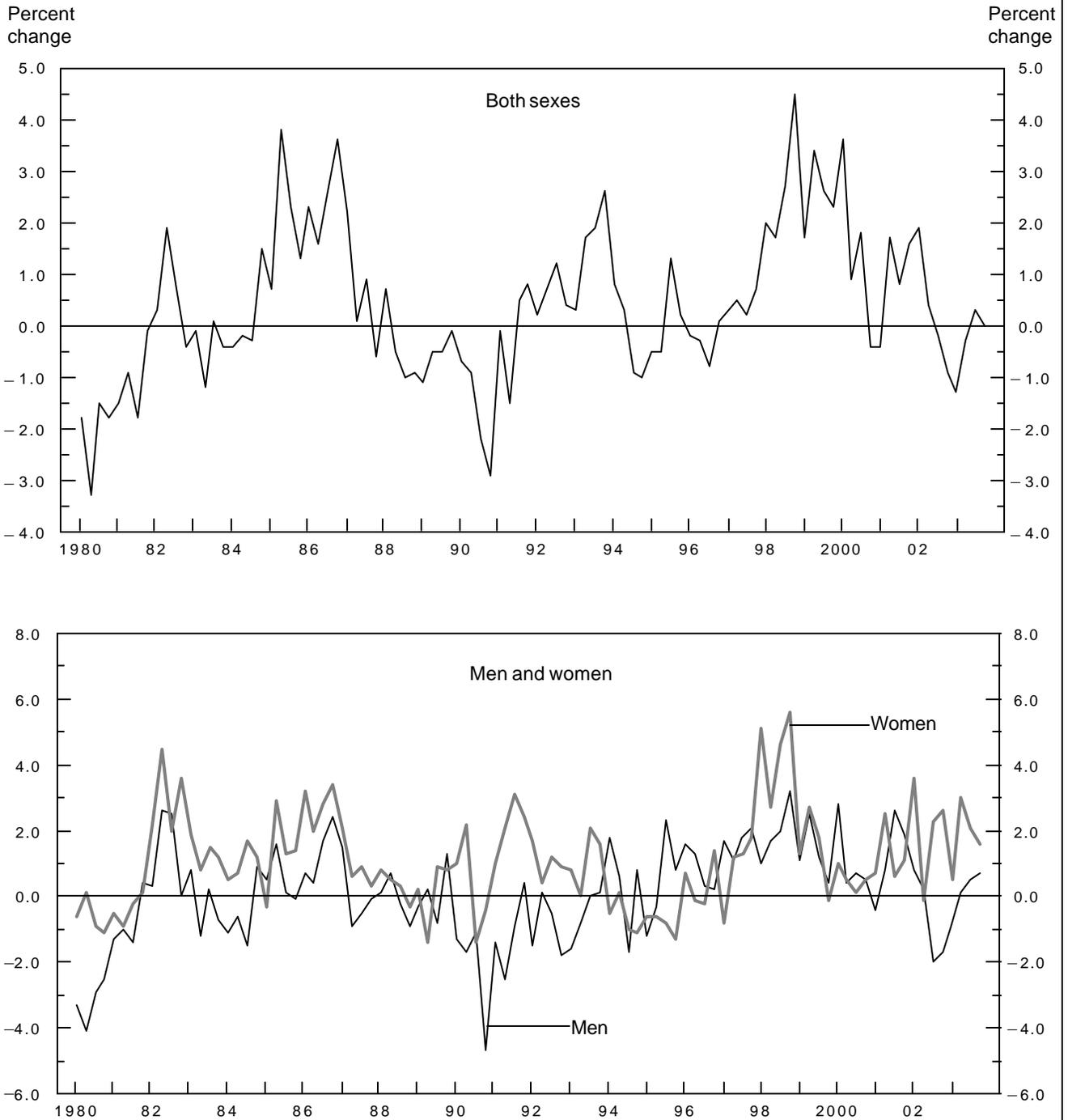
One important advantage of using the CPS to examine trends in earnings is that the survey enables researchers, policymakers, and others to estimate not just mean or median earnings, which provide insight on trends in the middle of the earnings distribution, but also the full distribution of earnings, such as the proportion of workers who earn, say, less than \$300 per week or more than \$1,500 per week. Users of CPS earnings data also can examine measures such as quartiles, deciles, and percentiles. Like the CPS, the National Compensation Survey also can be used to estimate means, medians, quartiles, deciles, percentiles, and distributions of earnings.<sup>19</sup> Such measures can be examined because both surveys collect earnings information for each individual worker or job.<sup>20</sup>

The CES survey and the Quarterly Census of Employment and Wages can be used to calculate mean earnings but not medians, quartiles, and so forth. These data sources collect information on each establishment’s aggregate pay, and mean earnings are calculated by dividing aggregate pay by the number of workers (for mean weekly or annual earnings) or aggregate work hours (for mean hourly earnings). Because these data sources do not collect pay information for individual workers or jobs, however, it is not possible to calculate other measures of earnings.

Measures such as deciles and quartiles are important for understanding earnings trends in parts of the distribution other than the middle. While it is useful to know about earnings trends for the average or median worker, it also is important to have measures of earnings trends for the lowest and highest paid workers. Just as medians divide a population into 2 parts with an equal number of workers, deciles divide a population into 10 parts with an equal number of workers. Ten percent of workers have earnings at or below the upper limit of the first decile, and 90 percent have higher earnings. Ninety percent of workers have earnings at or below the lower limit of the 10th decile, and 10 percent have higher earnings.

The lowest-paid 10 percent of workers (first decile) experienced declines in real earnings during most years from 1980 to 1996. (See chart 5.) Real earnings for these workers grew from 1997 to 2002 and remained unchanged in 2003. Just as 1998 saw strong growth in real median earnings, that year also saw the strongest growth in the upper limit of the first decile, which rose by 4.3 percent from the prior year. Real earnings growth for the lowest-paid decile slowed to 0.2 percent in 2000. The recession year of 2001 saw an increase of 0.9 percent, followed by a gain of 0.4 percent in 2002. In 2003, the real earnings of the lowest-paid decile were unchanged from the prior year.

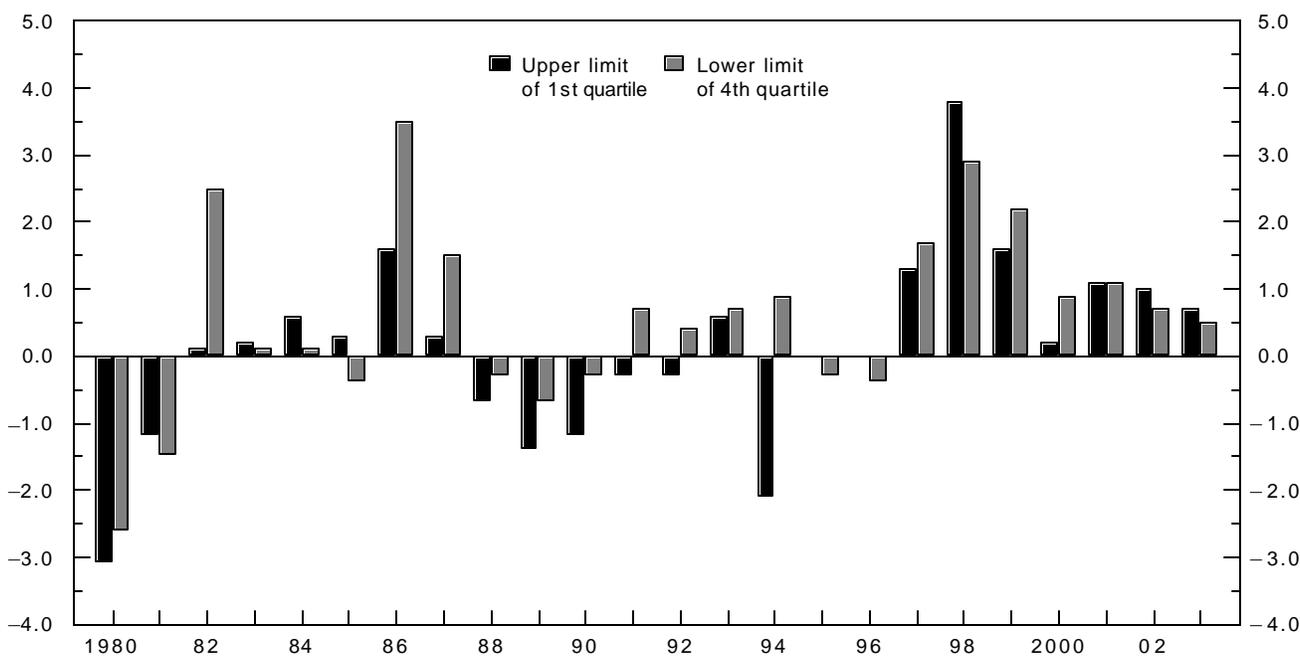
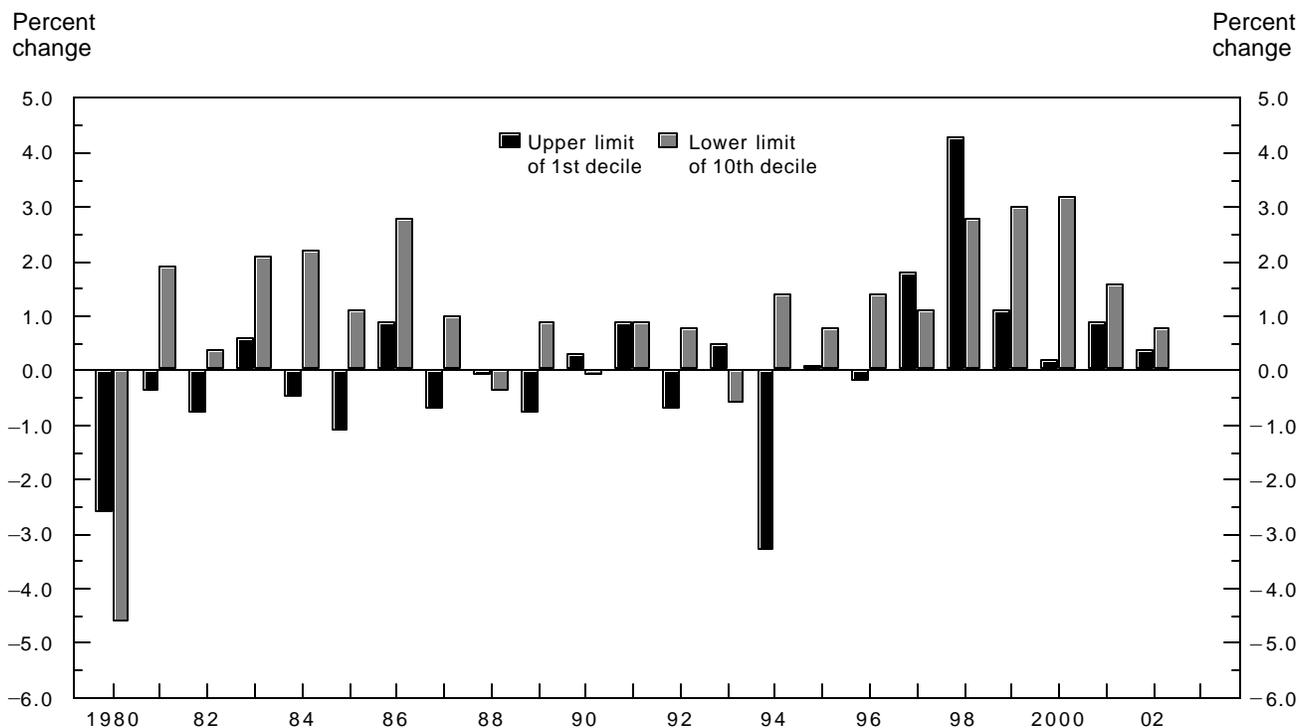
**Chart 4. Percent change from four quarters earlier in inflation-adjusted median usual weekly earnings of full-time wage and salary workers, by sex, 1980-2003**



NOTE: Data not seasonally adjusted.

SOURCES: Bureau of Labor Statistics, Current Population Survey (CPS), and Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS).

**Chart 5. Percent change from the previous year in selected deciles and quartiles of inflation-adjusted usual weekly earnings of full-time wage and salary workers, age 25 or older, 1980–2003**



SOURCES: Bureau of Labor Statistics, Current Population Survey (CPS), and Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS).

Real earnings of the highest-paid 10 percent of full-time wage and salary workers age 25 or older (10th decile) rose in all but 5 years from 1980 to 2003. The lower limit of the 10th decile declined by 4.6 percent during 1980, a year of recession and high inflation. Increases in the lower limit of the 10th decile have been the norm since then, with small declines occurring only in 1988, 1990, and 1993, and no change occurring in 2003. All other years saw increases, most exceeding 1 percent, some exceeding 2 percent, and a few reaching 3 percent.

Quartiles divide a population into four parts with an equal number of workers. One-fourth of workers have earnings at or below the upper limit of the first quartile, and three-fourths have higher earnings. Three-fourths of workers have earnings at or below the lower limit of the fourth quartile, and one-fourth have higher earnings. Chart 5 also shows CPS estimates from 1980 to 2003 of the percent change from the previous year in the inflation-adjusted upper limit of the first earnings quartile and the lower limit of the fourth quartile for full-time wage and salary workers age 25 or older. In most years, changes in these quartiles moved in the same direction. That was not always the case, however, and when real earnings for the first quartile rose, real earnings for the fourth quartile usually rose by a larger percent. Likewise, when real earnings for the first quartile fell, real earnings for the fourth quartile usually fell by a smaller percent.

Earnings data from the CPS have many strengths, including the ability to estimate means, medians, and other measures of the full earnings distribution and to examine earnings trends for a variety of demographic groups. Earnings series derived from establishment sources lack demographic information because employers cannot provide such information about their workers as accurately as workers or members of their households can. CPS earnings data have limitations, however, and it is important for users of the data to know about these limitations.

All data sources—whether administrative records or sample surveys or whether obtained from employers or workers—potentially include reporting errors. The case can be made, however, that employers can provide accurate earnings information more easily than workers or members of their households. After all, employers have to pay their workers and withhold the correct amount of taxes each pay period. Many employers also have management information systems that make it easy to retrieve accurate pay information. By comparison, the household-based CPS includes self-responses and “proxy” responses—that is, one person in the household answers questions on behalf of himself or herself and everyone else in the household. Most people can report fairly accurately, if not precisely, how much they earn, although they may have more difficulty reporting their gross pay before taxes and other deductions than if they were asked

to report their take-home pay. Most people also would have more difficulty reporting the earnings of other members of their households, even when they are close family members.

Inaccuracies in CPS earnings reports also may result from the tendency of respondents to round dollar amounts or report the amount of take-home pay rather than gross pay before taxes and other deductions. The CPS earnings questions, by design, do not capture earnings that the respondent does not regard as “usual,” such as one-time bonuses that sometimes amount to a substantial proportion of total annual compensation. Another problem is nonresponse by people who are unwilling or unable to provide earnings information. Nonresponse also is a potential problem with establishment data sources, but once an establishment agrees to participate in a survey, it generally provides information for all items in the survey.<sup>21</sup> In the CPS and other household surveys, respondents who otherwise cooperate may choose not to answer specific questions about topics they regard as sensitive, and many people find questions about their earnings to be sensitive.<sup>22</sup>

## Productivity statistics program

The real hourly compensation estimates from the BLS productivity statistics program are derived in part from the national income measures produced by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. The largest component of national income is compensation of employees. BEA estimates the compensation of employees from a variety of sources, including several that are described in other sections of this article. BEA is responsible for providing estimates of total output and income in the United States each quarter, and it is important that these measures be as comprehensive as possible. Each of the BLS data sources described so far in this article exclude some groups of workers or some forms of compensation; the BEA estimates of employee compensation come from a variety of data sources to cover virtually all workers and all sources of compensation.

BEA estimates of employee compensation are divided into two categories, wages and salaries and “supplements to wages and salaries.” The primary source that BEA uses to estimate wages and salaries for workers in the private sector is the BLS Quarterly Census of Employment and Wages, which includes workers covered by State unemployment insurance programs. The QCEW excludes workers in railroads and some farms and nonprofit organizations, so BEA obtains data from the Railroad Retirement Board, the U.S. Department of Agriculture, and other sources to estimate wages and salaries for these workers. Because the QCEW data are available with a lag of approximately 6 months, BEA estimates private-sector wages and salaries for the most recent quarters by extrapolating employment, hours, and earnings from the monthly BLS Current Employment Statistics survey. As described earlier, the

CES survey currently does not obtain information about the hours and earnings of nonproduction workers in manufacturing and mining, construction workers in the construction industry, or supervisory workers in service-providing industries. The earnings information from the CES survey also does not include tips, stock options, the cash value of payments in kind, and many commissions and bonuses. The QCEW, by comparison, obtains hours and earnings information for all workers and includes a more comprehensive definition of wages and salaries. Because of the differing coverage of the CES survey and the QCEW, BEA sometimes must revise the wage and salary estimates fairly substantially when updated QCEW information becomes available.

To estimate wages and salaries for Federal Government employees, BEA obtains information on wages from the U.S. Office of Personnel Management and augments this information with monthly BLS estimates of Federal employment. For State and local government workers, BEA uses wage information from the QCEW. Because of the lag before QCEW data are available, BEA estimates State and local government wages and salaries for the most recent quarters using employment estimates from the monthly BLS Current Employment Statistics survey and wage and salary estimates from the quarterly BLS Employment Cost Index.

BEA also estimates so-called “supplements to wages and salaries,” which include employer payments for Social Security and other legally required benefits and employer-provided benefits, such as health insurance, life insurance, disability insurance, and retirement and profit-sharing plans. BEA obtains information on employers’ costs for Social Security and other legally required benefits from the Social Security Administration and other Federal, State, and local agencies that administer these programs.

BEA obtains information on costs for employer-provided benefits from a variety of sources. Information on employers’ costs for health insurance comes from the U.S. Department of Health and Human Services and from the BLS Employment Cost Index. For life insurance and private disability insurance, BEA acquires information from insurance industry sources. For private-sector retirement and profit-sharing plans, BEA obtains information from the BLS Employment Cost Index and the Internal Revenue Service.

Once BEA produces quarterly estimates of compensation for employees, BLS then makes several adjustments to calculate real hourly compensation. One adjustment that BLS makes for published series is to exclude certain categories of workers that are included in the BEA estimates of compensation. The broadest sector for which BLS publishes estimates of productivity and real hourly compensation is the business sector, and that sector excludes nonprofit organizations, private households, and general government. (The sector includes government-owned businesses, however.) This article fo-

cuses on the real hourly compensation series for the nonfarm business sector, which is the business sector minus farms.

After subtracting the compensation of employees in nonprofit organizations, private households, and general government, BLS divides the aggregate estimates of compensation by estimates of aggregate hours worked—that is, average hours worked times the number of workers. The primary source of hours and employment estimates is the CES survey, but the Employment Cost Index and Current Population Survey are used as well.

The CES survey obtains information on hours *paid* for private-sector production or nonsupervisory workers. To estimate labor productivity, however, it is necessary to know the number of hours *worked*, excluding the time for which workers were on paid leave and did not contribute to output. For the *quarterly productivity measures*, information from the Employment Cost Index component of the National Compensation Survey is used to estimate the ratio of hours worked to hours paid for private-sector production or nonsupervisory workers.<sup>23</sup> This ratio then is applied to the monthly CES survey estimates of hours paid to provide a timely estimate of aggregate hours worked by private-sector production or nonsupervisory workers.

Estimates of hours worked by nonproduction workers in manufacturing and mining, construction workers in the construction industry, and supervisory workers in private service-providing industries are developed from the Current Population Survey. The CPS is used to estimate the ratio of the average weekly hours of nonproduction or supervisory workers to the average weekly hours of production or nonsupervisory workers. This ratio then is multiplied by the ECI-adjusted CES estimate of the average weekly hours worked by production or nonsupervisory workers.<sup>24</sup>

Information on the hours worked by farm owners and workers, owners of unincorporated nonfarm businesses, and unpaid family workers is obtained from the Current Population Survey of households. In farms, retail establishments, restaurants, and some other types of businesses, the time that proprietors spend working represents a substantial portion of labor input, so BLS productivity estimates and the corresponding compensation estimates must account for the work done by business owners. The hourly rate of compensation for owners is assumed to equal the average compensation for wage and salary workers in the same industry as the owners’ businesses. This assumed hourly rate of compensation is multiplied by the aggregate hours of farm and business owners, and BLS adds the total to the estimates of compensation obtained from BEA.

BLS estimates of productivity and real hourly compensation also reflect the hours worked on an unpaid basis by members of the owner’s family. Although these workers are not paid directly for their work, they contribute to the output of

the farm or business, so failing to include their work hours would lead to an overestimate of labor productivity. These unpaid family workers presumably benefit from the profits of the farm or business, so their work hours also should be included in estimates of hourly compensation.

Once the fairly complicated process of estimating aggregate compensation and work hours is complete, BLS then derives estimates of average hourly compensation. These estimates are adjusted for inflation using the CPI-U-RS.

During the period of recession and high inflation in 1980, real hourly compensation declined. (See chart 6.) Real hourly compensation grew little in 1981, but growth accelerated during the recession year of 1982. As the economy began to recover in 1983 and the first half of 1984, real hourly compensation declined slightly. Moderate growth resumed in the second half of 1984 and 1985, and real hourly compensation grew even more strongly in 1986. Growth slowed markedly in the first half of 1987 and declined slightly in the second half. Real hourly compensation grew moderately in 1988 but then declined again during 1989. During the 1990–91 recession and into 1992, real hourly compensation grew moderately. In 1993 and 1994, real hourly compensation declined somewhat before growing moderately in 1995, 1996, and 1997. In 1998, real hourly compensation grew very strongly, and growth continued at a more moderate pace in 1999 and

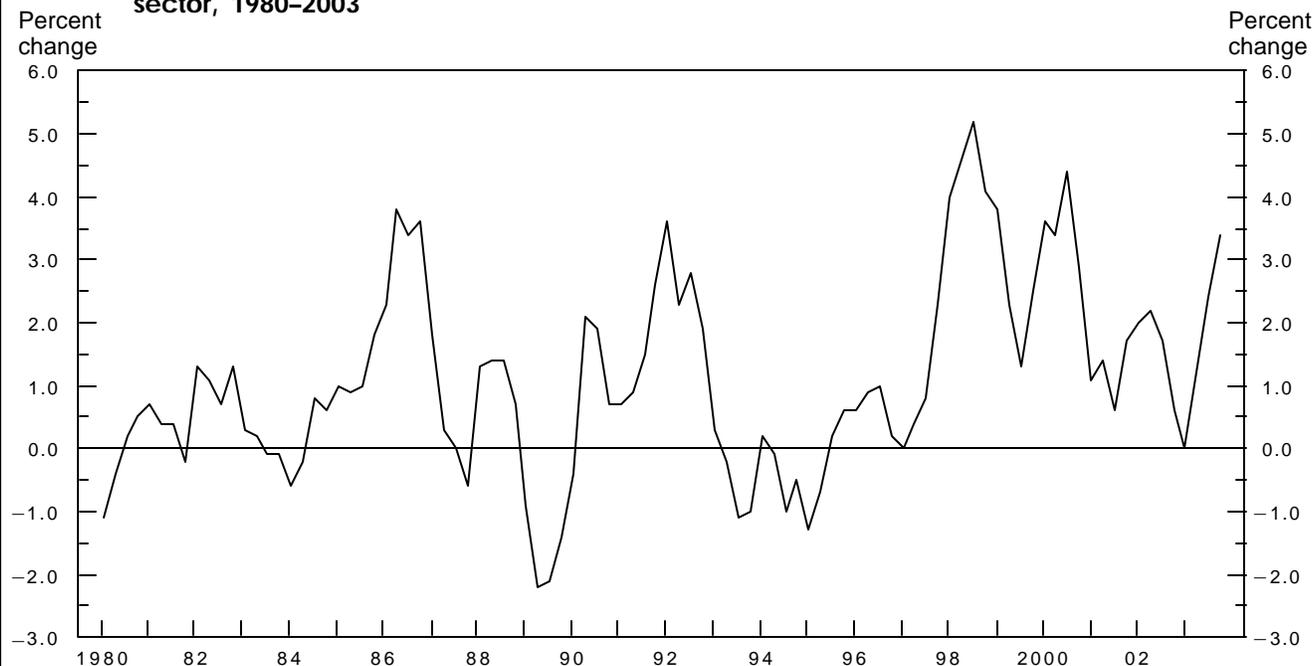
2000. Real hourly compensation growth slowed further in the recession year of 2001 but generally remained positive through 2003.

### The long-run results

Each compensation series examined in this article shows similarities in the pattern of changes in inflation-adjusted wages and salaries for any given year or group of years. For example, each of the data sources showed that real wages and salaries declined in 1980 and 1981. Each also showed fairly substantial gains in compensation in the mid- to late 1990s, particularly in 1998. In a few years, real earnings from one data source or another moved in the opposite direction from the other data sources. Even when all the compensation series moved in the same direction in a particular year, they did not all move by the same percent. How do each of the compensation data series track each other over the long run?

The answer is obtained by using 1979 as the base year, and computing the percent change in 10 inflation-adjusted compensation series for each year since 1979.<sup>25</sup> (See table 3.) The first three columns of the table show percent changes in the Employment Cost Index. The ECI for total compensation increased 26.8 percent from 1979 to 2003. The wage and salary component of the ECI increased 17.2 percent, while

**Chart 6. Percent change from four quarters earlier in real hourly compensation in the nonfarm business sector, 1980–2003**



NOTE: Data are seasonally adjusted.

SOURCES: Bureau of Labor Statistics, Major Sector Productivity Statistics program.

**Table 3.** Percent change from 1979 in real compensation measures

Year	Employment Cost Index for workers in the private nonfarm sector			Current Employment Statistics survey, private-sector production or nonsupervisory workers		Quarterly Census of Employment and Wages annual wages	Current Population Survey median usual weekly earnings of full-time wage and salary workers			Real hourly compensation in nonfarm business sector
	Total compensation	Wages and salaries	Benefits	Average hourly earnings	Average weekly earnings		Both sexes	Men	Women	
1980	-0.9	-1.4	0.9	-1.8	-2.7	-1.6	-1.8	-2.5	-1.1	0.6
1981	.6	-.9	4.5	-2.7	-4.3	-1.8	-1.8	-2.2	-1.0	.3
1982	2.1	.4	6.8	-3.0	-5.5	-1.1	-2.2	-2.2	2.5	1.7
1983	4.0	1.6	10.7	-2.5	-3.8	-.5	-2.6	-2.9	3.7	1.6
1984	5.2	2.0	13.6	-3.2	-4.8	.1	-1.1	-2.0	5.0	2.1
1985	5.5	2.5	13.6	-3.6	-5.7	1.3	.2	-2.1	6.4	4.0
1986	7.8	4.8	16.4	-2.9	-5.6	3.5	3.9	.3	10.1	7.7
1987	7.1	4.0	15.7	-4.0	-6.4	4.6	3.3	.1	10.3	7.2
1988	8.0	4.3	18.9	-4.3	-7.0	5.8	2.3	-.8	10.0	7.8
1989	8.7	4.1	21.1	-4.6	-7.7	4.7	2.3	.5	11.0	6.4
1990	7.5	2.5	22.1	-6.5	-10.2	4.3	-.7	-4.2	10.5	7.2
1991	9.7	3.8	26.8	-6.0	-9.8	4.8	.0	-3.9	13.2	10.0
1992	10.8	4.0	30.1	-6.1	-9.7	7.7	.4	-5.6	14.2	12.1
1993	12.2	4.8	33.5	-5.9	-9.1	7.0	3.0	-5.5	16.0	11.0
1994	13.3	5.5	35.5	-5.3	-8.2	7.1	2.0	-4.8	14.7	10.3
1995	13.6	6.1	35.4	-4.8	-8.3	8.1	2.2	-3.9	13.2	11.0
1996	13.6	6.4	34.0	-4.2	-7.4	9.4	2.4	-3.8	14.9	11.2
1997	15.8	8.9	35.0	-1.9	-4.7	12.3	3.0	-1.8	16.9	13.8
1998	18.1	11.6	36.3	.3	-2.8	16.6	7.6	1.4	23.5	18.5
1999	18.9	12.4	37.3	1.3	-2.4	19.1	10.1	1.8	23.3	21.4
2000	20.1	13.0	40.2	2.1	-2.0	22.2	9.7	2.4	24.0	24.8
2001	23.2	15.5	45.2	3.6	-1.7	21.9	11.4	4.4	25.4	27.0
2002	24.3	15.9	48.5	4.5	-.8	21.8	10.4	2.6	28.6	27.9
2003	26.8	17.2	55.1	4.6	-1.0	22.2	10.5	3.3	30.7	32.2

NOTE: For each compensation series except the Quarterly Census of Employment and Wages, the base period is the 4th quarter of 1979, and the percent changes are calculated as of the 4th quarter of each subsequent year. For the Quarterly Census of Employment and Wages, the base period

is the annual average for 1979, and the percent changes are calculated from the annual averages of each subsequent year. For all compensation series, the Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS) is used to adjust for inflation.

employers' costs for benefits rose 55.1 percent.

The last column in the table shows that real hourly compensation in the nonfarm business sector increased 32.2 percent from the fourth quarter of 1979 to the fourth quarter of 2003. That increase is similar to the 26.8 percent increase in the ECI for total compensation. Such similar trends seem logical because, despite the many methodological differences between the real hourly compensation series and the ECI for total compensation, these series are the only ones that include employers' costs for benefits in addition to wages and salaries.

The QCEW is the principal source of the wage and salary component of the real hourly compensation series. The inflation-adjusted annual wages based on the QCEW increased 22.2 percent from 1979 to 2003. That increase is larger than the 17.2 percent increase in the ECI wage and salary series from 1979 to 2003.

The Current Population Survey estimates of the inflation-adjusted median usual weekly earnings of full-time wage and salary workers rose 10.5 percent from 1979 to 2003. Very different patterns emerged for women and men, however.

Real median earnings for women increased 30.7 percent from 1979 to 2003, while the real earnings for men rose just 3.3 percent over that period. The overall increase shown by the CPS (10.5 percent) is considerably smaller than the increases shown in the ECI wage and salary series (17.2 percent) or in the QCEW (22.2 percent).

The CES survey series on average hourly and weekly earnings of private-sector production or nonsupervisory workers show sharply different results from the other data series. Real average hourly earnings as estimated from the CES survey were lower than they were in 1979 for every year from 1980 to 1997. By 1998, real average hourly earnings finally exceeded those in 1979, but the net increase from 1979 to 2003 was only 4.6 percent. The trend in real average weekly earnings was even weaker, as the average length of the workweek was nearly 2 hours shorter in 2003 than in 1979. From 1979 to 2003, real average weekly earnings as estimated from the CES survey had declined by 1.0 percent.<sup>26</sup>

Why do the earnings series from the CES survey paint a far worse picture of real earnings trends than do the other BLS

data sources? It may stem from the different coverage of job categories in the CES survey as compared with the other data sources. As described earlier, the earnings information obtained from the CES survey is for production or nonsupervisory workers, and the earnings of nonproduction workers in goods-producing industries and supervisors in service-providing industries are excluded. The earnings of workers excluded from the scope of the CES survey may have grown more rapidly than those of production or nonsupervisory workers over the 1979–2003 period.

This hypothesis can be investigated by examining a special ECI series on the real wages and salaries of production or nonsupervisory workers in the private sector. This ECI series shows that real wages and salaries for production or nonsupervisory workers grew 14.7 percent from the end of 1979 to the end of 2003. That is a smaller increase than the 17.2 percent shown by the real ECI for wages and salaries of all private-sector workers, indicating that the real earnings of supervisors and nonproduction workers indeed grew at a faster rate. Nonetheless, the ECI shows a much larger real earnings gain for production or nonsupervisory workers than do either the hourly or weekly real earnings series from the CES, thus suggesting that other factors may somehow affect the differing estimates from the ECI and CES survey.

What about long-run earnings trends for the lowest and

highest paid workers? These are shown in percent changes from 1979 in the CPS estimates of the upper limit of the 1st decile and 1st quartile and the lower limit of the 4th quartile and 10th decile. (See table 4.) The first column in the table shows that, among full-time wage and salary workers, the real earnings of the bottom decile in 2003 were barely above the level of 1979. For nearly all of the intervening years, the lowest-paid 10 percent of workers made less than they did in 1979, after adjusting for consumer price inflation.

The real earnings of the bottom quartile in 2003 were 2.9 percent above the level of 1979. Each year from 1980 to 1999, the lowest-paid 25 percent of workers made less than they did in 1979, after adjusting for consumer price inflation. Only in 2001, 2002, and 2003 did the real earnings of the bottom quartile exceed their 1979 level.

The highest-paid 25 percent of full-time wage and salary workers earned 14.7 percent more in real terms in 2003 than they did in 1979. The real earnings of the top quartile were below their 1979 level each year from 1980 to 1985. Beginning in 1986, the real earnings of these workers exceeded the 1979 level.

The highest-paid 10 percent of workers did well from 1984 to 2003, and especially since the mid- to late 1990s. In the first few years of the 1980s, these highest-paid workers earned less in real terms than they did in 1979. Beginning in

**Table 4.** Percent change from 1979 in Current Population Survey estimates of selected deciles and quartiles of usual weekly earnings of full-time wage and salary workers age 25 or older adjusted for consumer price inflation

Year	Upper limit of the 1st decile	Upper limit of the 1st quartile	Lower limit of the 4th quartile	Lower limit of the 10th decile
1980	-2.6	-3.1	-2.6	-4.6
1981	-3.0	-4.3	-4.1	-2.8
1982	-3.9	-4.2	-1.6	-2.4
1983	-3.3	-4.0	-1.5	-4
1984	-3.8	-3.4	-1.4	1.7
1985	-4.8	-3.2	-1.8	2.8
1986	-4.0	-1.6	1.7	5.7
1987	-4.7	-1.2	3.1	6.8
1988	-4.8	-2.0	2.8	6.4
1989	-5.5	-3.4	2.0	7.3
1990	-5.3	-4.5	1.8	7.2
1991	-4.4	-4.8	2.5	8.1
1992	-5.1	-5.0	2.9	9.0
1993	-4.7	-4.5	3.6	8.3
1994	-7.8	-6.4	4.6	9.8
1995	-7.7	-6.5	4.3	10.7
1996	-7.9	-6.5	3.9	12.2
1997	-6.3	-5.3	5.7	13.4
1998	-2.2	-1.7	8.8	16.6
1999	-1.1	-1	11.1	20.2
2000	-.9	.1	12.1	24.0
2001	.0	1.2	13.3	26.0
2002	.4	2.2	14.2	27.0
2003	.3	2.9	14.7	27.0

NOTE: The base period is the annual average for 1979, and the percent changes are calculated from the annual averages of each subsequent year.

The Consumer Price Index for All Urban Consumers Research Series (CPI-U-RS) is used to adjust for inflation.

1984, the real earnings of these workers exceeded the 1979 level. In 2003, the lower limit of the 10th earnings decile was 27 percent higher, after adjusting for consumer price inflation, than it was in 1979.

SEVERAL DATA SOURCES AVAILABLE from the Bureau of Labor Statistics provide information on trends in real compensation. Each of these data sources reveals different trends in real compensation over the long run and, to some extent, the short run. Each data source has its strengths and limitations. All are useful for macroeconomic analysis, and, because the series do not always move by the same amount or in the same direction, it is wise to examine each one to understand general trends in real compensation.

For purposes other than macroeconomic analysis, some series are more appropriate than others. For example, the CES survey is especially useful for analyzing earnings trends of production or nonsupervisory workers in specific industries because of its large sample size. The Quarterly Census of Employment and Wages also provides very reliable earn-

ings information for specific industries. Like the CES survey, the QCEW does not provide earnings information for specific occupations. The QCEW covers all types of workers, however, including nonproduction workers and supervisors. The Current Population Survey is the only information source available on earnings trends for different demographic groups, and the survey also provides earnings information for specific occupations. The Employment Cost Index and the real hourly compensation series from the BLS productivity statistics program provide more comprehensive measures of compensation that include not just wages and salaries but also employers' costs for benefits. The Employment Cost Index enables data users to distinguish changes in wages and salaries from changes in benefits costs, both in the aggregate and for specific categories of benefits.

There are many potential uses for information on real compensation, and more than one data source may be appropriate for any particular use. Knowing the features of each data source is essential before deciding on which source or sources to focus. □

## Notes

<sup>1</sup> The BLS programs that provide information on compensation are the National Compensation Survey, the Current Employment Statistics survey, the Quarterly Census of Employment and Wages, the Current Population Survey, the Occupational Employment Statistics survey, the National Longitudinal Surveys, and the Consumer Expenditure Survey. In addition to these programs, the BLS productivity statistics program provides data series on employee compensation and unit labor costs, which are derived from national income data produced by the Bureau of Economic Analysis of the U.S. Department of Commerce.

<sup>2</sup> The CPI-U represents about 87 percent of the total U.S. population. It is based on the expenditures of almost all residents of urban or metropolitan areas, including professionals, the self-employed, the poor, the unemployed and retired persons, as well as urban wage earners and clerical workers. Not included in the CPI-U are the spending patterns of persons living in rural nonmetropolitan areas, farm families, persons in the Armed Forces, and those in institutions, such as prisons and mental hospitals. The CPI-W is based on the expenditures of households that are included in the CPI-U definition that also meet two requirements: more than half of the household's income must come from clerical or wage occupations and at least one of the household's earners must have been employed for at least 37 weeks during the previous 12 months. The CPI-W's population represents about 32 percent of the total U.S. population and is a subset of the CPI-U's population.

<sup>3</sup> More information about the CPI-U-RS and its limitations is on the Internet at <http://www.bls.gov/cpi/cpiurstx.htm>. For a more detailed discussion of this research series, see *Kenneth J. Stewart and Stephen B. Reed*, "Consumer Price Index research series using current methods, 1978-98," *Monthly Labor Review*, June 1999, pp. 29-38, available on the Internet at <http://www.bls.gov/opub/mlr/1999/06/art4full.pdf>

<sup>4</sup> For an analysis of the effects of holding constant the occupation and industry employment shares in the calculation of the ECI, see Michael K. Lettau, Mark A. Loewenstein, and Aaron T. Cushner, "Explaining the Differential Growth Rates of the ECI and the ECEC," *Compensation and Working Conditions*, Summer 1997, pp. 15-23, available on the Internet at <http://www.bls.gov/opub/cwc/archive/summer1997art2.pdf>

<sup>5</sup> Historical tables showing constant-dollar Employment Cost Indexes

are updated each quarter and are posted on the BLS website at <http://www.bls.gov/web/econst.pdf>. The inflation adjustment for these published estimates uses the CPI-U. The estimates in this article instead use the CPI-U-RS.

<sup>6</sup> Information about the index for private-sector health insurance costs is available on the BLS website at <http://www.bls.gov/ncs/ect/sp/health.pdf>

<sup>7</sup> Quarterly averages of hourly earnings are calculated using the following formula:

$$\text{Quarterly AHE} = \frac{((PW_1)(AHE_1) + (PW_2)(AHE_2) + (PW_3)(AHE_3))}{(PW_1 + PW_2 + PW_3)}$$

Where:

$PW_1$  = the number of production or nonsupervisory workers in the first month of the quarter

$PW_2$  = the number of production or nonsupervisory workers in the second month of the quarter

$PW_3$  = the number of production or nonsupervisory workers in the third month of the quarter

$AHE_1$  = the average hourly earnings in the first month of the quarter

$AHE_2$  = the average hourly earnings in the second month of the quarter

$AHE_3$  = the average hourly earnings in the third month of the quarter

Quarterly averages of weekly earnings are calculated in the same way except that the monthly figures on average weekly earnings are substituted for the monthly figures on average hourly earnings.

<sup>8</sup> Average weekly hours generally declined from 1979 to 2003, in part because employment shifted from goods-producing industries, which typically have higher average hours, to service-providing industries, which generally have lower average hours. In addition, average hours tend to decline during recessions and rise during expansions. These secular and cyclical fluctuations in average weekly hours affect how closely the series on average hourly earnings and average weekly earnings track each other. For additional information on trends in hours, see Katie Kirkland, "On the decline in average weekly hours worked," *Monthly Labor Review*, July

2000, pp. 26–31, available on the Internet at <http://www.bls.gov/opub/mlr/2000/07/art3full.pdf>

<sup>9</sup> According to the Explanatory Note published by BLS each month in *Employment and Earnings*, **production and related workers** include working supervisors and all nonsupervisory workers (including group leaders and trainees) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping, trucking, hauling, maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (for example, power plant), record keeping, and other services closely associated with production operations. **Construction workers** include the following employees in the construction industry: working supervisors, qualified craft workers, mechanics, apprentices, helpers, laborers, and so forth, engaged in new work, alterations, demolition, repair, maintenance, and the like, whether working at the site of construction or in shops or yards at jobs (such as precutting and preassembling) ordinarily performed by members of the construction trades. **Nonsupervisory employees** are employees (not above the working-supervisor level) such as office and clerical workers, repairers, salespersons, operators, drivers, physicians, lawyers, accountants, nurses, social workers, research aides, teachers, drafters, photographers, beauticians, musicians, restaurant workers, custodial workers, attendants, line installers and repairers, laborers, janitors, guards, and other employees at similar occupational levels whose services are closely associated with those of the employees listed.

<sup>10</sup> See Katharine G. Abraham, James R. Spletzer, and Jay C. Stewart, "Divergent Trends in Alternative Wage Series," in John Haltiwanger, Marilyn E. Manser, and Robert Topel, eds., *Labor Statistics Measurement Issues* (Chicago: The University of Chicago Press, 1998).

<sup>11</sup> See Patricia M. Getz, "CES program: changes planned for hours and earnings series," *Monthly Labor Review*, October 2003, pp. 38–9, available on the Internet at <http://www.bls.gov/opub/mlr/2003/10/ressum1.pdf>

<sup>12</sup> For more information on the history of unemployment insurance coverage and on estimates of the number of workers currently not covered by unemployment insurance, see *BLS Handbook of Methods*, chapter 5, on the Internet at <http://www.bls.gov/opub/hom/home.htm>. See also the section on unemployment insurance laws and coverage in the 2002 publication *Employment and Wages* at <http://www.bls.gov/cew/cewbultn02.htm>

<sup>13</sup> Under most State laws or regulations, wages include bonuses, stock options, the cash value of meals and lodging, tips and other gratuities, and, in some States, employer contributions to certain deferred compensation plans such as 401(k) plans. Covered employer contributions for Social Security and Medicare, unemployment insurance, workers' compensation, and employer-provided health insurance and other benefits are not reported as wages. Employee contributions for the same purposes are reported as wages, as is money withheld for income taxes, union dues, and so forth.

<sup>14</sup> Readers should note that the QCEW database and all other censuses and surveys can have nonsampling errors. Nonsampling errors can occur for many reasons, including the failure to include a segment of the population, inability to obtain information for all respondents in the sample, inability or unwillingness of respondents to provide correct information on a timely basis, mistakes made by respondents, and errors made in the collection or processing of the data. All BLS programs take steps to ensure quality and minimize nonsampling errors, but such errors cannot be eliminated completely.

<sup>15</sup> Households are in the CPS sample for 4 months, leave the sample for 8 months, and then return to the sample for 4 more months. Earnings questions are asked of households in the fourth and eighth months of participation in the sample.

<sup>16</sup> It is theoretically possible to calculate hourly wages for all wage and salary workers, not just those paid hourly rates, but BLS generally has not felt comfortable making such calculations because of the large number of assumptions that would be required. The CPS questions ask about usual earnings, usual hours, and hours worked during the survey reference week. Unusual events sometimes happen that can affect how much people earn.

For example, there may be weeks when people work more or fewer hours than they usually do. Likewise, the CPS earnings questions, by design, do not capture earnings that the respondent does not regard as "usual," such as one-time bonuses that sometimes amount to a substantial proportion of total annual compensation. Those unusual events bring into question whether CPS reports of usual earnings and usual weekly hours would accurately reflect workers' hourly earnings. There also is evidence that some CPS respondents report working more hours than they actually work. For a more thorough discussion of the reporting of hours in the CPS, see Abraham and others, "Divergent Trends in Alternative Wage Series." Although BLS has not calculated hourly earnings from the CPS for all wage and salary workers, other researchers and organizations have made such estimates from the publicly available CPS microdata files.

<sup>17</sup> Prior to 1994, respondents were asked how much they usually earned per week. Since January 1994, respondents have been asked to identify the easiest way for them to report earnings (hourly, weekly, biweekly, twice monthly, monthly, annually, other) and how much the worker usually earns in the reported time period. Earnings reported on a basis other than weekly are converted to a weekly equivalent. Prior to 1994, earnings for multiple jobholders were reported for all jobs combined. Since January 1994, respondents have been asked to report earnings of multiple jobholders only for the main job. Because of the changes in the Current Population Survey questionnaire, earnings estimates for 1994 and subsequent years are not strictly comparable with earnings estimates for earlier years.

<sup>18</sup> Although BLS publishes estimates of median earnings for part-time workers, the data generally are not analyzed in BLS publications. The average workweek for people at work part time was 21.6 hours in 2003, but the distribution of hours around that average is wide. About 20 percent of part-time workers worked fewer than 15 hours per week, half worked 15 to 29 hours per week, and about 30 percent worked 30 to 34 hours. In addition, some part-time workers with fairly high weekly hours may be regarded as full-time workers by their employers, and that designation may result in these workers receiving higher hourly pay rates and more compensation in the form of benefits. An examination of earnings that includes all part-time workers in the same group therefore is probably inappropriate. The average workweek for people at work full time in 2003 was 44.5 hours, and the distribution is more narrowly concentrated around that average; 54 percent of full-time workers had a workweek of exactly 40 hours and 76 percent worked 35 to 48 hours.

<sup>19</sup> For examples of National Compensation Survey estimates of means, medians, and percentiles, see *National Compensation Survey: Occupational Wages in the United States, July 2003, Supplementary Tables* (Bureau of Labor Statistics, August 2004) available on the Internet at <http://www.bls.gov/ncs/ocs/sp/ncbl0636.pdf>

<sup>20</sup> Means and medians both are useful measures of the middle of an earnings distribution, and these measures are identical for perfectly normal distributions. Most earnings distributions are approximately normal, but they usually are not perfectly normal, so the mean and median differ somewhat. For example, the July 2003 National Compensation Survey estimate of mean hourly earnings of full-time workers in the private sector was \$18.07, while the median was \$14.45. The 2003 annual average Current Population Survey estimate of mean usual weekly earnings of full-time wage and salary workers was \$801, while the median was \$620. Means can be influenced by exceptionally high or low earnings values for individual workers, but medians are not affected by such outliers. Both survey samples apparently include some jobs or workers with exceptionally high earnings, explaining why the estimated means from both surveys are higher than the medians. Customarily, BLS publications focus on means when presenting National Compensation Survey data and medians when presenting Current Population Survey data. One reason for the focus on medians in the Current Population Survey is that earnings values have been top-coded to help protect the confidentiality of respondents with unusually high earnings. With top-coding, an earnings value above a certain threshold is coded at the threshold itself, rather than at the value reported by the respondent. Such top-coding artificially reduces the level of means but does not affect medians. The top-coding thresholds used in the Current Population Survey have risen over time, and earnings estimates published by BLS for 1994 and later years are not based on top-coded data.

(CPS earnings values that are included on the public-use microdata files available to researchers outside of BLS continue to be top-coded, however.) These changes in top-coding procedures affect the historical comparability of mean earnings levels from the Current Population Survey.

<sup>21</sup> Although responding establishments generally provide complete and accurate pay information, that is not necessarily the case with information about benefits. The National Compensation Survey obtains information on employers' costs for providing each type of benefit, the percent of workers participating in each benefit plan, and the detailed provisions of each benefit plan. The detailed provisions of each benefit plan usually are obtained from plan brochures provided by employers, but employers sometimes are unable or unwilling to provide plan brochures.

<sup>22</sup> In the CPS, adjustments for nonresponse to questions about earnings and other topics are made through a statistical imputation procedure. In this procedure, answers from survey participants who answered specific questions are assigned to survey participants with similar labor market and demographic characteristics who did not answer those specific questions. This imputation procedure provides the benefit of increasing the sample size available to analyze important characteristics of workers and their jobs, but it is an imperfect adjustment because it assumes that survey participants who are similar in known characteristics also are similar in unknown characteristics.

<sup>23</sup> Estimates of productivity and real hourly compensation for years prior to 2001 are based on the ratio of hours worked to hours paid, as derived from the annual BLS Hours at Work Survey. BLS terminated the Hours at Work Survey after 2000, and information from the ECINow is used to estimate the ratio of hours worked to hours paid. More information on this change in the source of data on hours worked is on the Internet at <http://www.bls.gov/lpc/lprhws/lprhwhp.pdf>

<sup>24</sup> BLS adopted these procedures for estimating the average weekly hours of nonproduction or supervisory workers in August 2004. Historical estimates of productivity and hourly compensation were revised accordingly back to January 1979, when the CPS began to include questions each month

about hours worked. For additional information about these procedures, see the document, "Construction of Average Weekly Hours for Supervisory and Nonproduction Wage and Salary Workers in Private Nonfarm Establishments," dated October 14, 2004, on the Internet at <http://www.bls.gov/lpc/lprswawhtech.pdf> For further discussion of the procedures used previously by the BLS productivity statistics program and the research used to develop the current procedures, see Lucy P. Eldridge, Marilyn E. Manser, and Phyllis Flohr Otto, "Alternative measures of supervisory employee hours and productivity growth," *Monthly Labor Review*, April 2004, pp. 9–28, available on the Internet at <http://www.bls.gov/opub/mlr/2004/04/art2full.pdf>

<sup>25</sup> The reason 1979 was chosen as the base year is the availability of data from the Current Population Survey and Employment Cost Index. Questions on usual earnings were added to the monthly Current Population Survey in 1979. Prior to that year, questions on weekly earnings were asked only in special supplements to the Current Population Survey that were conducted during May. Information on employers' costs for benefits also was added to the Employment Cost Index in 1979.

<sup>26</sup> As explained earlier in this article, the choice of the price index used to adjust each compensation series for inflation can affect estimates of real earnings growth. Because the earnings estimates from the Current Employment Statistics survey include only production or nonsupervisory workers, the CPI-W is used in the official monthly BLS Real Earnings report to adjust the current earnings figures for inflation. This price index is thought to reflect more closely the price changes for the types of goods and services purchased by workers in the production or nonsupervisory category. Using the CPI-U-RS to adjust for inflation, the real average hourly earnings of private-sector production or nonsupervisory workers increased 4.6 percent from the fourth quarter of 1979 to the fourth quarter of 2003. Using instead the CPI-W to adjust for inflation, real average hourly earnings increased just 0.8 percent over the same time period. The real average weekly earnings of private-sector production or nonsupervisory workers declined 1.0 percent from 1979 to 2003 using the CPI-U-RS to adjust for inflation; the decline is 4.6 percent when the CPI-W is used.