Earnings and employment trends in the 1990s

Robust employment growth in high- and low-paying job categories was not accompanied by large wage gains; there was no apparent increase in overall earnings dispersion during the 1990s

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Earnings have long been considered an important measure of one's economic well-being, and it is widely accepted that increased earnings over time result in improved living standards. In the United States, real earnings rose sharply for several decades after World War II, but the trend slowed abruptly during the 1970s. Although the picture during the 1980s and much of the 1990s is less clear because of different patterns among the major earnings measures, it is safe to say that there was comparatively little real wage growth during that period.[1] In recent years, however, workers' real earnings have been on the rise.

The stagnation in real earnings for much of the 1990s stands in marked contrast to the considerable growth in employment during that decade. As of December 1999, the end of the period examined in this article, the current economic expansion had lasted almost 9 years.[2] During that period, total employment, as measured by the Current Population Survey (CPS), grew by more than 16½ million.[3]

Previous research, using data from the CPS, showed that employment growth during the first half of the 1990s was concentrated in both relatively higher paying and relatively lower paying job categories, with a decline in the number of jobs paying midlevel wages.[4] That same research supported the notion that there was a trend toward "polarization" in employment growth. However, it did not examine the *earnings* trends

in the fields associated with those categories, nor did it address whether the marked employment growth in some of the categories was accompanied by wage gains. The analysis presented herein extends the earlier work by examining the changes in both employment *and* earnings for all wage and salary workers over the 1989–99 period.[5] Specifically, the analysis addresses the following questions: What has been the relationship between the change in employment and the change in real median weekly earnings? In particular, how have earnings changed in those job categories that posted the largest increases in employment? In addition, what happened to earnings dispersion during the 1990s, especially within the high-, middle-, and low-paying job categories?

The findings presented in the sections that follow suggest that the marked growth in wage and salary employment that took place from 1989 to 1999 in the highest and lowest earnings groups was not accompanied by a rapid rise in earnings. Earnings indeed rose, but only modestly, for both groups. In contrast, both employment and wages in the middle earnings group changed relatively little over the period. While some specific occupation-industry categories posted both strong employment *and* earnings growth, no significant correlation between employment and earnings changes was uncovered for the three major earnings groups. Finally, despite the polarization found in employment growth, earnings dispersion showed little change over the 1989–99 period.[6]

Overview

The real median weekly earnings of all wage and salary workers showed little change from 1989 to 1996. In 1997, however, real earnings rose, and growth continued through 1999. As a result of these increases, there was a slight improvement in real earnings (6.9 percent) for the 1989–99 period. (Real weekly earnings were adjusted by means of the Consumer Price Index research series using current methods (CPI-U-RS; see box, this page).[7] During those years, wage and salary employment grew by 15.5 million, or 15.0 percent, with virtually all of the net growth occurring after the 1990–91 recession. (See chart 1 and table 1.) It is important to note that the bulk of this job growth has been among full-time workers, whose share of the net growth over the past 10 years (about four-fifths) was in line with their share of total employment in 1989.[8]

As shown in table 1, real median weekly earnings rose in professional specialty, sales, and service occupations, but changed relatively little among the other major occupational groups, such as managers. Together, managers and professionals accounted for three-fifths of the occupational employment growth. Workers in sales and service occupations supplied most of the remaining net increase in employment.

Among the major industry groups, real earnings rose in retail trade, in services, and in the finance, insurance, and real estate industry. Real earnings changed relatively little among the other major industries. Of the total increase in wage and salary employment since 1989, most of the net growth (about four-fifths) occurred in services and retail trade.

Occupations within industries

Employment matrix. A separate look at employment and earnings trends in major occupations and industries provides some insight into the nature of job and earnings growth, but an examination of the changes for occupations *within* industries presents a more complete picture. For example, the fast-growing services industry pays about the same as the median for all industries, but encompasses a wide array of occupations, some of which are associated with low wages, some with relatively high wages.[9] The disaggregation of an industry by occupation allows one to determine, in much greater detail than at the aggregate level, which pieces of the industry are contributing to employment or earnings growth. However, analyzing the changes in employment and earnings for the nine major occupations crossed by the 10 major industries (yielding 90 data series) can be quite cumbersome. To simplify such an analysis, the data series were ordered into a more manageable format.

First, following the methods employed earlier by Ilg, the occupation-industry categories were ranked in descending order by their median weekly earnings in 1988. The categories were then classified into three groups—highest, middle, and lowest earnings—each of which accounted for approximately one-third of total employment in 1988.[10] The data for the 90 individual occupation-industry categories were then sorted into the three earnings groups. Table 2 displays the employment and real median weekly earnings figures for the individual categories and the overall figures for each of the three earnings groups for the years 1989 and 1999.[11]

Highest earnings group. From 1989 to 1999, employment in the highest earnings group increased by 9.7 million, or about 27 percent—the most of the three earnings groups. Real median weekly earnings for the highest group showed only modest improvement. By 1999, real median weekly earnings in this group had risen by 6.3 percent, to $728 per week.

As the U.S. economy moved out of the recession of the early 1990s and employment expanded, job growth in the highest earnings group accelerated, and strong growth continued through 1999. In contrast, real median weekly earnings for the

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The Bureau of Labor Statistics statement on the use of the CPI-U-RS

The Bureau of Labor Statistics has made numerous improvements to the Consumer Price Index (CPI) over the past quarter-century. While these improvements make the present and future CPI more accurate, historical price index series are not adjusted to reflect the improvements. Many researchers, however, expressed an interest in having a historical series that was measured consistently over the entire period. Accordingly, the Consumer Price Index research series using current methods (CPI-U-RS) presents an estimate of the CPI for all Urban Consumers (CPI-U) from 1978 to 1998 that incorporates most of the improvements made over that time span into the entire series.

The CPI-U-RS is in some ways an extension of the CPI-U-X1, an experimental series that shows what the inflation rate in the CPI-U might have been if the current rental-equivalence method of measuring the cost of homeownership had been in place prior to 1983.

The CPI-U-RS has some limitations. First, most estimates are based on BLS research covering a short period of time and extrapolated to a longer period. Therefore, there is considerable uncertainty surrounding the magnitude of the adjustments. Second, there have been several improvements in the CPI not incorporated into the CPI-U-RS, either because they do not represent changes in methodology, because they had negligible impacts on the CPI's growth rate, or because it was impossible to systematically estimate the impacts of the new methods in past years.

Nonetheless, the CPI-U-RS can serve as a valuable proxy for researchers needing a historical estimate of inflation using current (1999) methods. The direct adjustment of individual CPI index series makes this the most detailed and systematic estimate available of a consistent CPI series.

Table 1. Employment and median weekly earnings of wage and salary workers, by occupation and industry, 1989 and 1999

[Numbers in thousands]

Occupation and Industry	Employment				Median weekly earnings in constant 1999 dollars[1]			
	1989	1999	Change[2]		1989	1999	Change[2]	
			Number	Percent			Number	Percent
Occupation								
Total	103,480	118,963	15,483	15.0	$447	$478	$31	6.9
Executive, administrative,								
and managerial	11,950	16,000	4,050	33.9	728	760	32	4.4
Professional specialty	13,408	18,693	5,285	39.4	688	735	47	6.8
Technicians and related support	3,511	4,188	677	19.3	574	578	4	.7
Sales occupations	11,354	13,451	2,097	18.5	352	387	35	9.9
Administrative support, including clerical .	17,768	17,874	106	.6	390	400	10	2.6
Service occupations	14,410	16,829	2,419	16.8	245	273	28	11.4
Precision production, craft, and repair	11,906	12,474	568	4.8	574	582	8	1.4
Operators, fabricators, and laborers	17,399	17,514	115	.7	392	396	4	1.0
Farming, forestry, and fishing	1,774	1,940	166	9.4	280	301	21	7.5
Industry								
Total	103,480	118,963	15,483	15.0	447	478	31	6.9
Agriculture	1,499	1,735	236	15.7	289	307	18	6.2
Mining...	665	534	−131	−19.7	724	731	7	1.0
Construction	5,798	6,747	949	16.4	536	525	−11	−2.1
Manufacturing	20,831	19,408	−1,423	−6.8	528	554	26	4.9
Transportation and public utilities	7,692	8,944	1,252	16.3	634	619	−15	−2.4
Wholesale trade	3,942	4,586	644	16.3	513	528	15	2.9
Retail trade	17,299	20,185	2,886	16.7	258	289	31	12.0
Finance, insurance, and real estate	7,045	7,780	735	10.4	494	556	62	12.6
Services	33,133	43,077	9,944	30.0	408	460	52	12.7
Public administration	5,576	5,966	390	7.0	607	636	29	4.8

[1] Data are restricted to wage and salary workers and exclude the self-employed, regardless of whether their businesses are incorporated. The data include both full- and part-time workers. The Consumer Price Index research series using current methods (CPI-U-RS) was used to convert current dollars to constant dollars for 1989.

[2] Calculated from the rounded estimates shown.

NOTE: Employment growth was calculated using annual averages for 1989 and 1999.

group dipped in the mid-1990s, but earnings growth in 1997–99 was strong enough to produce a small gain for the period as a whole. (See chart 2.)

As might be expected, virtually all the high-paying managerial and professional occupations are concentrated in this group. Employment among managers and professionals in the highest earnings group accounted for about two-thirds of total employment in the group in 1989, but made up nearly all of the net employment increase over the 1989–99 period. Managers and professionals in the services industry expanded their ranks sharply, together accounting for about two-thirds of the employment gain in the highest earnings group. The trend in their earnings, however, was comparable to that for the overall group, declining a bit in the middle of the decade, but more than recovering toward the end. While the number of executives in construction, manufacturing, and transportation also rose substantially from 1989 to 1999, their earnings were little changed. (See table 2.)

Although managers and professionals dominate in the highest earnings group, some other occupations include a large number of high-paid workers. For example, precision production workers in manufacturing and transportation accounted for a sizable share of employment in the highest earnings group. However, employment and earnings for both job categories changed little over the 1989–99 period.

In 1989, full-time workers accounted for slightly more than 90 percent of employment within the highest earnings group. However, full-time workers contributed a somewhat smaller share of the net increase in job growth over the 10-year period. This difference reflects the fact that much of the overall employment growth occurred among professionals in the services industry, wherein part-time work is more prevalent than it is among professionals in other industries.

No consistent relationship is evident between employment and earnings changes in the highest earnings group over the 1989–99 period. For example, the number of executives in services rose sharply, as did their earnings. Yet, at the same time, employment among managers in transportation and public utilities also increased, but their earnings were little changed; conversely, employment among professionals in construction was little changed, but their earnings declined.

One measure that more systematically identifies the association between two variables (in this case, employment and earnings) is the simple correlation coefficient. To construct

Chart 1. Percent change in employment and real median weekly earnings of wage and salary workers, 1989–99
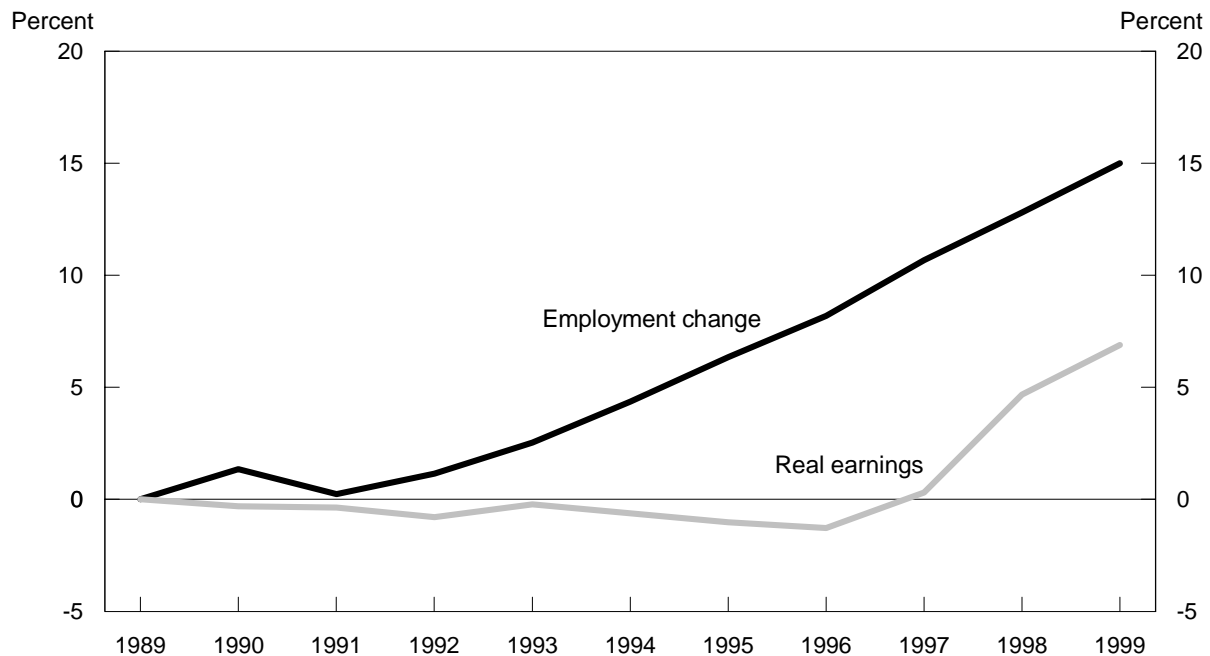
Percent

Percent

NOTE: The percent shown represents the percent growth or decline in annual average employment or real median weekly earnings between the year indicated and the level in 1989.

this measure, we used the percent change in employment for each occupation-industry category (weighted by its share of total employment in 1989) and the percent change in earnings. The correlation coefficient ranges from –1.0 to 1.0, with 1.0 indicating a perfect positive relationship and –1.0 a perfect negative relationship.

For the highest earnings group, the correlation coefficient was 0.29, which, while positive, does not indicate a high degree of association between changes in employment and changes in earnings. (The correlation coefficient for this group was not statistically different from zero at the 90-percent confidence level.) Hence, the strongest growing occupation-industry categories in the high-earnings group were not necessarily associated with the fastest earnings growth.

Middle earnings group. From 1989 to 1999, employment in the middle earnings group edged up, as growth in the second half of the period offset losses during the recession of the early 1990s.[12] Employment remained below prerecession levels until 1997. Substantial job growth in 1997 and 1998, however, led to a net employment gain of some 400,000, about 1 percent, over the entire 1989–99 period. (See chart 2.)

Real earnings in the middle earnings group drifted down for most of the period, before recovering markedly during 1997–99. In 1989, median weekly earnings were $464 (in con-
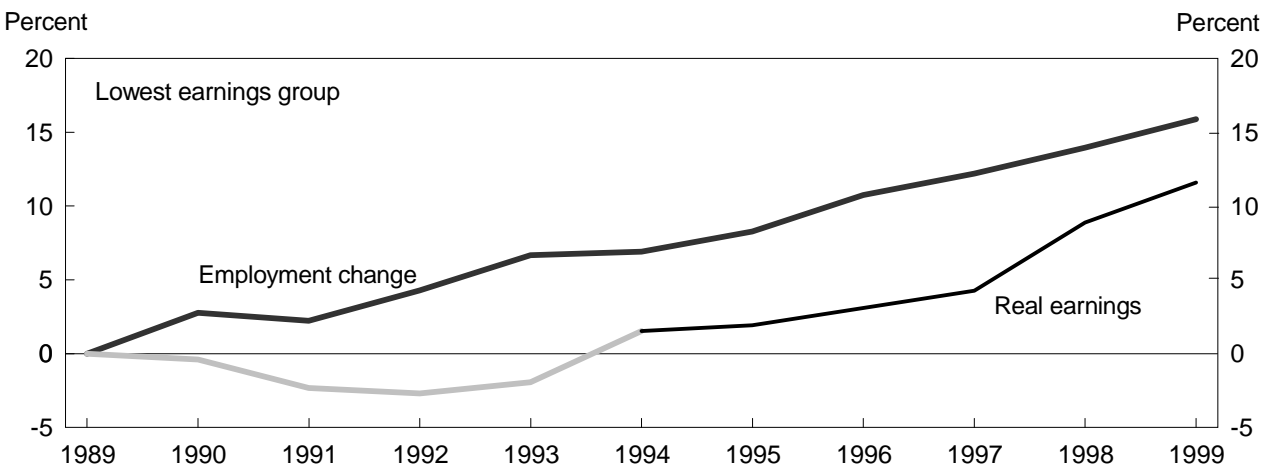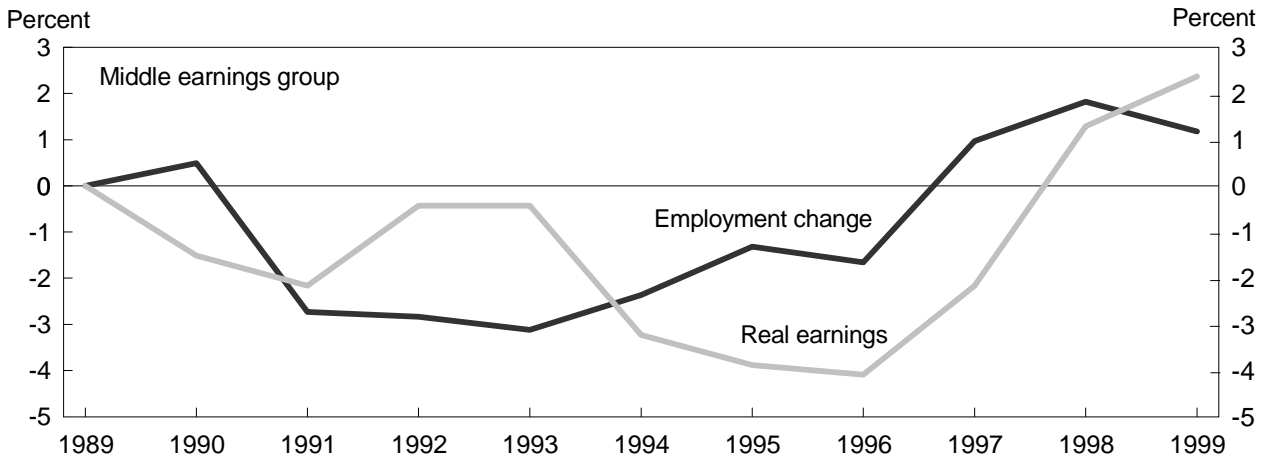
stant 1999 dollars). After reaching a low point in 1996 ($445), earnings rose sharply. As a result, by 1999, earnings in the middle earnings group—at $475—were little changed from 1989. (See table 2.)

The pattern of little overall change in employment and earnings trends for the middle earnings group masked variations in several detailed occupation-industry categories. Many of these categories include blue-collar occupations in a variety of goods- and service-producing industries. Employment in some occupation-industry categories, such as operators, fabricators, and laborers in both construction and the transportation and public utilities industry, grew markedly over the past decade, but their weekly earnings declined. Employment declined significantly, however, among operators, fabricators, and laborers in manufacturing, while their earnings changed little.

A few occupation-industry categories other than those typified by blue-collar jobs showed substantial employment changes. The number of managers in retail trade increased, as did their earnings. Employment among technicians in the services industry also rose between 1989 and 1999, but their earnings were up only slightly. However, the number of clerical workers in manufacturing decreased, while earnings for the group increased.

As with full-time workers in the highest earnings group, full-time workers in the middle earnings group accounted for

Chart 2. Percent change in employment and real median weekly earnings of wage and salary workers, by earnings group, 1989–99
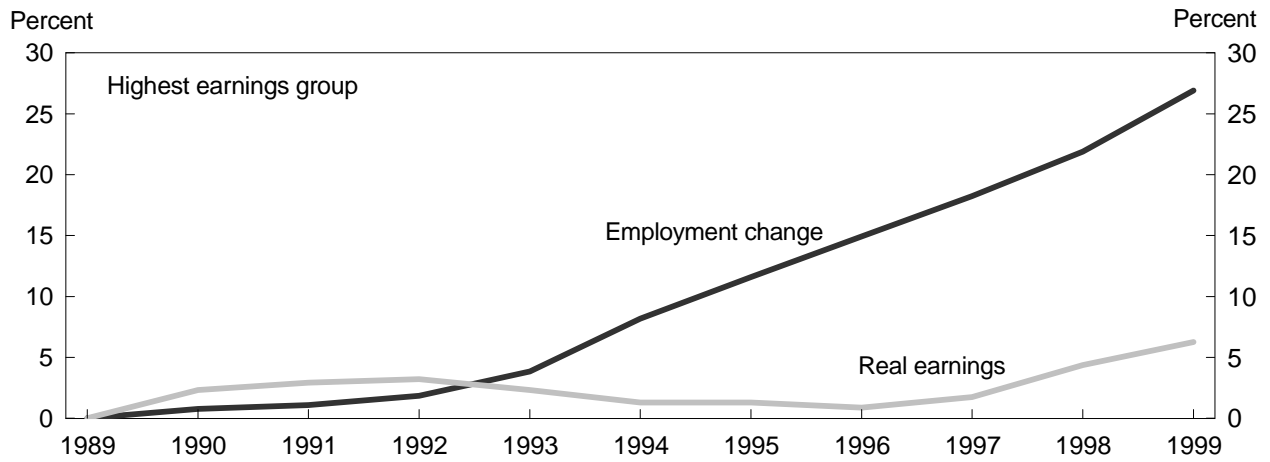
Percent

Percent

30

30

Highest earnings group

25

25

20

20

15

Employment change

15

10

10

5

Real earnings

5

0

0

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

Percent

Percent

3

3

Middle earnings group

2

2

1

1

0

0

-1

Employment change

-1

-2

-2

-3

Real earnings

-3

-4

-4

-5

-5

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

Percent

Percent

20

20

Lowest earnings group

15

15

10

10

5

Employment change

5

Real earnings

0

0

-5

-5

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

NOTE: The percent shown represents the percent growth or decline in annual average employment or real median weekly earnings between the year indicated and the level in 1989. Median weekly earnings for the lowest earnings group have been adjusted for the years 1989 93. (See note 13 in the text.)

Table 2. Employment and median weekly earnings of wage and salary workers, by major occupation and industry, 1989 and 1999

[Numbers in thousands]

Occupation	Industry	Employment				Median weekly earnings in constant 1999 dollars[1]			
				Change[2]				Change[2]	
		1989	1999	Number	Percent	1989	1999	Number	Percent
Highest earnings group	Highest earnings group								
Total		35,863	45,516	9,653	26.9	$685	$728	$43	6.3
Professional specialty	Finance, insurance, and real estate	198	378	180	90.9	811	856	45	5.5
Professional specialty	Wholesale trade	77	145	68	88.3	961	811	−150	−15.6
Executive, administrative, and managerial	Construction	473	784	311	65.8	795	798	3	.4
Executive, administrative, and managerial	Services	3,714	5,699	1,985	53.4	664	734	70	10.5
Professional specialty	Services	9,667	14,006	4,339	44.9	645	689	44	6.8
Technicians and related support	Finance, insurance, and real estate	131	188	57	43.5	669	713	44	6.6
Executive, administrative, and managerial	Transportation and public utilities	823	1,171	348	42.3	876	872	−4	−.5
Technicians and related support	Transportation and public utilities	262	354	92	35.1	781	781	0	.0
Executive, administrative, and managerial	Wholesale trade	401	541	140	34.9	673	716	43	6.4
Sales occupations	Finance, insurance, and real estate	1,242	1,611	369	29.7	667	672	5	.7
Service occupations	Public administration	1,370	1,742	372	27.2	630	630	0	.0
Professional specialty	Public administration	775	984	209	27.0	820	816	−4	−.5
Executive, administrative, and managerial	Finance, insurance, and real estate	1,884	2,311	427	22.7	685	733	48	7.0
Professional specialty	Mining	57	69	12	21.1	1,217	1,021	−196	−16.1
Professional specialty	Transportation and public utilities	463	549	86	18.6	863	931	68	7.9
Sales occupations	Wholesale trade	1,375	1,594	219	15.9	666	697	31	4.7
Executive, administrative, and managerial	Public administration	1,207	1,378	171	14.2	714	814	100	14.0
Executive, administrative, and managerial	Manufacturing	2,204	2,506	302	13.7	928	943	15	1.6
Professional specialty	Manufacturing	1,727	1,950	223	12.9	922	978	56	6.1
Precision production, craft, and repair	Transportation and public utilities	1,276	1,345	69	5.4	737	724	−13	−1.8
Professional specialty	Construction	138	143	5	3.6	956	919	−37	−3.9
Sales occupations	Construction	58	59	1	1.7	749	637	−112	−15.0
Sales occupations	Manufacturing	709	700	−9	−1.3	668	700	32	4.8
Precision production, craft, and repair	Manufacturing	4,004	3,837	−167	−4.2	600	607	7	1.2
Technicians and related support	Manufacturing	708	653	−55	−7.8	680	715	35	5.1
Technicians and related support	Public administration	251	231	−20	−8.0	668	658	−10	−1.5
Precision production, craft, and repair	Mining	220	189	−31	−14.1	736	719	−17	−2.3
Precision production, craft, and repair	Public administration	239	196	−43	−18.0	634	624	−10	−1.6
Executive, administrative, and managerial	Mining	87	66	−21	−24.1	1,060	1,051	−9	−.8
Middle earnings group	Middle earnings group								
Total		33,362	33,757	395	1.2	464	475	11	2.4
Technicians and related support	Retail trade	80	198	118	147.5	388	350	−38	−9.8
Professional specialty	Retail trade	275	420	145	52.7	471	600	129	27.4
Executive, administrative, and managerial	Retail trade	1,129	1,484	355	31.4	502	565	63	12.5
Precision production, craft, and repair	Finance, insurance, and real estate	131	172	41	31.3	462	498	36	7.8
Technicians and related support	Services	1,922	2,389	467	24.3	502	515	13	2.6
Precision production, craft, and repair	Services	1,319	1,637	318	24.1	480	515	35	7.3
Operators, fabricators, and laborers	Transportation and public utilities	2,135	2,602	467	21.9	541	517	−24	−4.4
Service occupations	Transportation and public utilities	263	317	54	20.5	485	405	−80	−16.5
Precision production, craft, and repair	Construction	3,260	3,723	463	14.2	553	541	−12	−2.2
Operators, fabricators, and laborers	Construction	1,416	1,592	176	12.4	447	428	−19	−4.3
Operators, fabricators, and laborers	Wholesale trade	928	1,043	115	12.4	395	400	5	1.3
Administrative support, including clerical	Transportation and public utilities	2,135	2,325	190	8.9	577	523	−54	−9.4
Technicians and related support	Construction	55	58	3	5.5	601	615	14	2.3
Precision production, craft, and repair	Wholesale trade	311	308	−3	−1.0	507	587	80	15.8
Precision production, craft, and repair	Retail trade	1,111	1,033	−78	−7.0	458	499	41	9.0
Administrative support, including clerical	Finance, insurance, and real estate	3,081	2,733	−348	−11.3	384	407	23	6.0
Operators, fabricators, and laborers	Manufacturing	8,736	7,636	−1,100	−12.6	411	421	10	2.4
Operators, fabricators, and laborers	Mining	176	151	−25	−14.2	626	590	−36	−5.8
Administrative support, including clerical	Public administration	1,504	1,269	−235	−15.6	454	474	20	4.4
Sales occupations	Transportation and public utilities	322	270	−52	−16.1	505	684	179	35.4
Farming, forestry, and fishing	Manufacturing	63	51	−12	−19.0	391	471	80	20.5

See footnotes at end of table.

[Numbers in thousands]

Occupation	Industry	Employment				Median weekly earnings in constant 1999 dollars[1]			
		1989	1999	Change[2]		1989	1999	Change[2]	
				Number	Percent			Number	Percent
Middle earnings group—continued	**Middle earnings group—continued**								
Administrative support, including clerical	Manufacturing	2,336	1,824	−512	−21.9	$441	$456	$15	3.4
Service occupations	Manufacturing	344	251	−93	−27.0	403	348	−55	−13.6
Operators, fabricators, and laborers	Public administration	155	105	−50	−32.3	492	473	−19	−3.9
Lowest earnings group	**Lowest earnings group**								
	Total	34,256	39,696	5,440	15.9	[3]259	289	30	11.6
Sales occupations	Services	794	1,114	320	40.3	275	318	43	15.6
Administrative support, including clerical	Agriculture	82	104	22	26.8	282	280	−2	−.7
Sales occupations	Retail trade	6,801	8,054	1,253	18.4	250	286	36	14.4
Operators, fabricators, and laborers	Retail trade	2,082	2,450	368	17.7	237	265	28	11.8
Administrative support, including clerical	Services	5,988	7,025	1,037	17.3	340	356	16	4.7
Service occupations	Retail trade	4,339	5,078	739	17.0	188	220	32	17.0
Service occupations	Services	7,742	9,056	1,314	17.0	242	267	25	10.3
Service occupations	Finance, insurance, and real estate	256	291	35	13.7	286	319	33	11.5
Farming, forestry, and fishing	Agriculture	1,186	1,339	153	12.9	279	293	14	5.0
Operators, fabricators, and laborers	Services	1,635	1,824	189	11.6	271	296	25	9.2
Administrative support, including clerical	Wholesale trade	747	795	48	6.4	382	403	21	5.5
Administrative support, including clerical	Retail trade	1,467	1,433	−34	−2.3	301	331	30	10.0
Administrative support, including clerical	Construction	353	336	−17	−4.8	354	387	33	9.3
Farming, forestry, and fishing	Services	352	327	−25	−7.1	250	331	81	32.4
Operators, fabricators, and laborers	Agriculture	76	69	−7	−9.2	354	326	−28	−7.9
Farming, forestry, and fishing	Finance, insurance, and real estate	61	55	−6	−9.8	293	329	36	12.3

[1] Data are restricted to wage and salary workers and exclude the self-employed, regardless of whether their businesses are incorporated. The data include both full- and part-time workers. The Consumer Price Index research series using current methods (CPI-U-RS) was used to convert current dollars to constant dollars for 1989.

[2] Calculated from the rounded estimates shown.

[3] The overall median weekly earnings figure for the lowest earnings group has been adjusted to make it more comparable with earnings data collected beginning in 1994. Figures for the more detailed occupation-industry categories have not been adjusted. (See note 13 in the text.)

NOTE: Details will not sum to totals because occupation-industry categories that had an employment base of less than 50,000 in 1989 or 1999 are not shown separately. Combined, these categories contributed only 56,000 to the net increase in employment. Data in each group are presented on the basis of change, from the largest percent increase to the largest decline. Employment growth was calculated using annual averages for 1989 and 1999.

more than 90 percent of employment in the group in 1989. But they made up just 55 percent of the small net increase in employment during the entire 1989–99 period. This difference is due, in part, to the large decline among certain manufacturing workers (operators, fabricators, and laborers; and administrative support personnel), the vast majority of whom work full time. At the same time, employment increased considerably among some occupations in the services and retail trade industries, in which part-time work is much more prevalent than in other industries.

Consistent with the variations in employment and earnings changes among the job categories in the middle earnings group, there was little correlation between the two variables. (The correlation coefficient was –0.06, not statistically different from zero at the 90-percent confidence level.)

Lowest earnings group. Employment in the lowest earnings group increased by 5.4 million (about 16 percent) between 1989 and 1999. Real earnings in the group rose by 11.6 percent, after adjustment.[13] Employment in the lowest earnings group was relatively unaffected by the recession of the early 1990s. Indeed, through 1993, the rate of employment growth among low-wage workers actually exceeded that for workers at the upper end of the earnings spectrum. However, by the mid-1990s, job growth in the high earnings group had outpaced growth in the lowest earnings group. As a result, over the entire 1989–99 period, net employment growth among low earners was about three-fifths that for the highest earnings group. As noted earlier, employment growth in both groups far exceeded that for middle-wage earners. (See chart 2 and table 2.)

In 1989, median weekly earnings for the lowest earnings

group were $259 (in constant 1999 dollars), after adjustment for the break in series associated with the CPS redesign. Following a slight decline in real earnings from 1989 to 1992, earnings in the lowest earnings group began to increase. Earnings rose markedly in 1998–99, reaching $289 in 1999.

Employment in the lowest earnings group is largely made up of service, sales, and administrative workers, as well as operators, fabricators, and laborers, in the retail trade and the services industries. Among these occupation-industry categories, some of the fastest growing were sales and service workers in the retail trade and services industries. These categories accounted for two-thirds of the net employment increase in the lowest earnings group. Real earnings for all four categories also rose over the 1989–99 period.

Among clerical workers in the lowest earnings group, the number working in the services industry rose substantially over the period, but their earnings were up only slightly. In contrast, the retail trade industry lost administrative support workers over the 1989–99 period, but posted a substantial increase in median weekly earnings.

Compared with the shares of the highest and middle earnings groups, a much smaller share of workers in the lowest earnings group worked full time in 1989 (about three-fifths). Even so, over the 1989–99 period, a large share of the net employment gain for the lowest earnings group was attributable to full-time workers (about four-fifths). This increase reflected, in part, the strong growth in the number of full-time workers in various occupations (for example, sales, service, and administrative occupations) within the services industry.

Even though employment growth was robust in the lowest earnings group and real earnings rose, the correlation coeffi-

cient was very low, 0.10 (not statistically different from zero at the 90-percent confidence level). This underscores the weak relationship between employment and earnings changes among the occupation-industry categories in the lowest earnings group.

In sum, employment grew substantially in the highest and in the lowest earnings groups from 1989 to 1999; job growth was especially pronounced in the highest earnings group. Real median weekly earnings also rose among workers in the high- and low-wage groups, with relatively more improvement among the lowest paid workers. Both employment and earnings among workers in the middle were essentially unchanged over the period. In addition, some specific occupation-industry categories in the three earnings groups posted both strong employment increases *and* real wage increases. However, there appears to be no systematic relationship between employment and earnings changes, as evidenced by the low correlation coefficients for the highest, middle, and lowest earnings groups.

Earnings dispersion

In this section, we turn to the question of whether the foregoing employment and earnings developments are associated with changes in wage dispersion. As a measure of central tendency, medians serve as an overall metric for the earnings of a given group and allow one to make general inferences as to how the earnings for the group have changed over time. However, medians provide no information on the degree of dispersion in an earnings distribution—that is, how widely spread individuals are in terms of their relative earnings levels—or the extent to which the dispersion has changed.

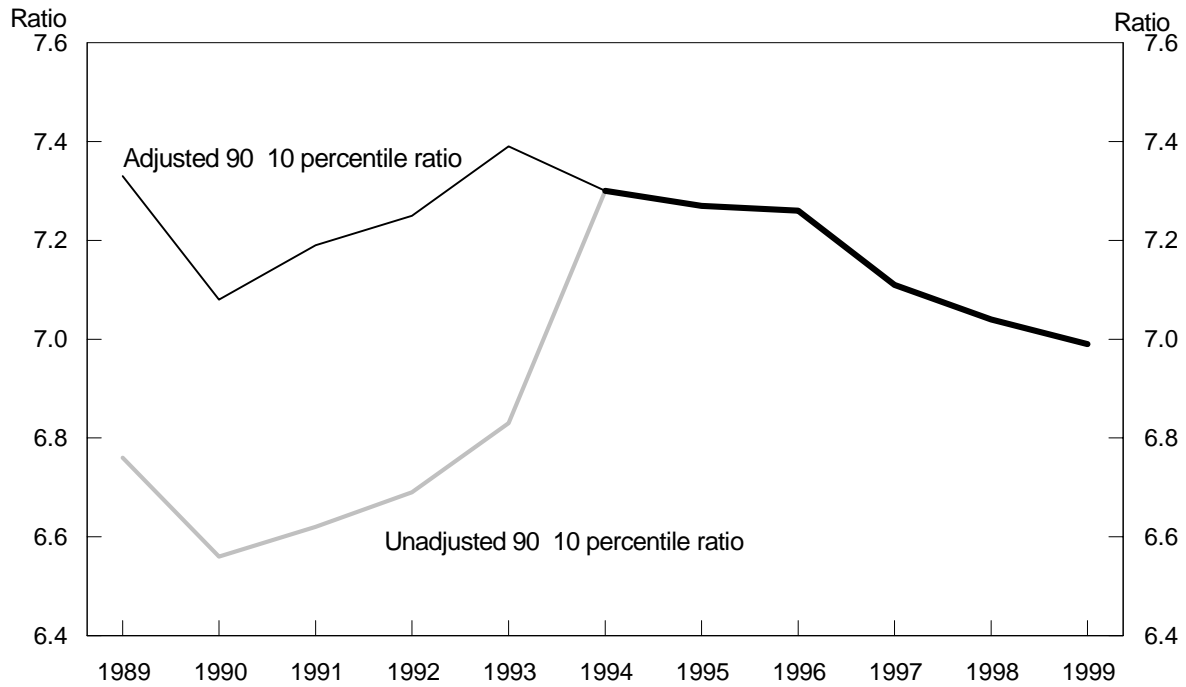One common method used to gauge changes in earnings

| Table 3. | Usual weekly earnings of wage and salary workers, by upper limits of selected deciles and quartiles, in current dollars and in constant 1999 dollars, annual averages, 1989–99 |

Year	Upper limit of—					Upper limit of—				
	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile
	In current dollars					In constant 1999 dollars				
1989	[1]$106	$206	$342	$532	$777	[1]$139	$269	$447	$696	$1,016
1990	[1]114	216	358	564	807	[1]142	269	446	702	1,005
1991	[1]116	223	371	585	834	[1]139	268	446	703	1,002
1992	[1]120	227	379	600	870	[1]140	266	444	702	1,018
1993	[1]122	233	391	616	901	[1]139	266	446	703	1,028
1994	128	236	398	636	935	143	263	444	710	1,044
1995	132	243	407	654	960	144	264	443	711	1,044
1996	136	250	417	673	988	144	265	441	712	1,046
1997	144	263	433	697	1,024	149	272	449	722	1,061
1998	154	277	458	727	1,084	157	283	468	743	1,108
1999	163	289	478	755	1,139	163	289	478	755	1,139

[1] The 10th-percentile earnings figure has been adjusted to make it more comparable with earnings data collected beginning in 1994. (See note 15 in the text.)
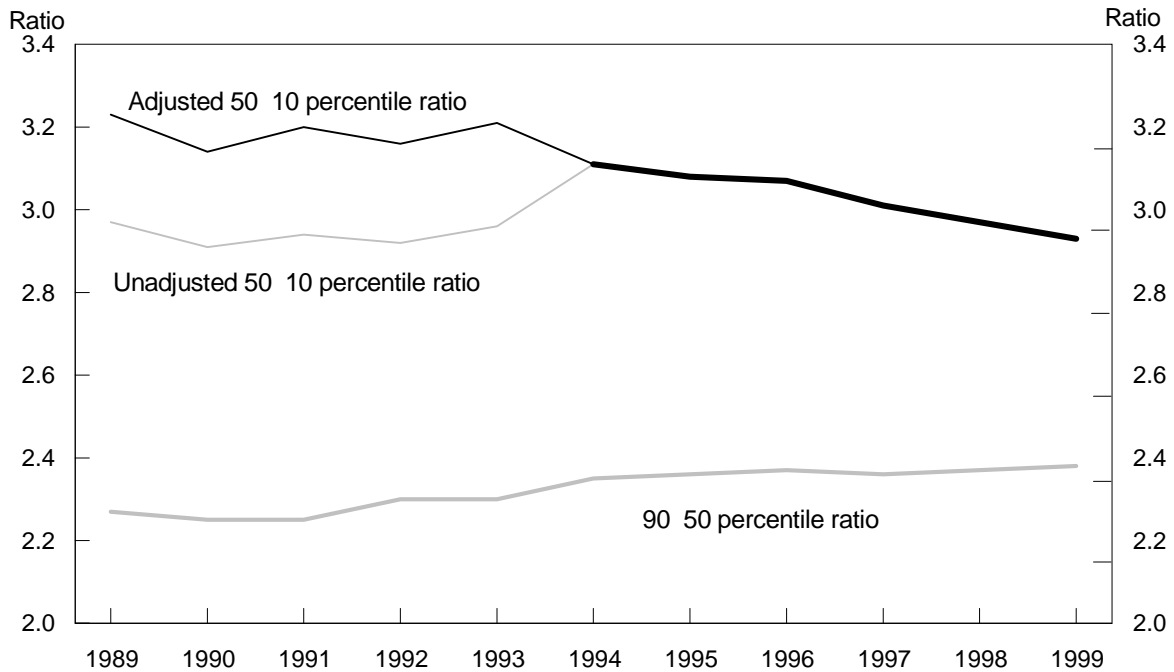
NOTE: The Consumer Price Index research series using current methods (CPI-U-RS) was used to convert current dollars to constant dollars for 1989–99.

Chart 3. The 90–10 and adjusted 90–10 percentile ratios for all wage and salary workers, 1989–99

Ratio

Adjusted 90 10 percentile ratio

Unadjusted 90 10 percentile ratio

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

NOTE: The 10th-percentile earnings figure has been adjusted to make it more comparable with earnings data collected beginning in 1994. (See note 15 in the text.)

Chart 4 . The 90–50, 50–10, and adjusted 50–10 percentile ratios for all wage and salary workers, 1989–99

Ratio

Adjusted 50 10 percentile ratio

Unadjusted 50 10 percentile ratio

90 50 percentile ratio

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

NOTE: The 10th-percentile earnings figure has been adjusted to make it more comparable with earnings data collected beginning in 1994. (See note 15 in the text.)

Table 4. Usual weekly earnings of wage and salary workers, by upper limits of selected deciles and quartiles, in current dollars and in constant 1999 dollars for the three earnings groups, annual averages, 1989–99

Highest earnings group

Year	Upper limit of—					Upper limit of—				
	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile
	In current dollars					In constant 1999 dollars				
1989	[1]$225	$370	$524	$758	$1,015	[1]$294	$484	$685	$991	$1,327
1990	[1]237	393	563	802	1,056	[1]295	489	701	999	1,315
1991	[1]247	405	587	814	1,116	[1]297	486	705	978	1,340
1992	[1]247	409	604	831	1,168	[1]289	479	707	973	1,367
1993	[1]256	417	614	868	1,209	[1]292	476	701	991	1,380
1994	258	415	622	894	1,237	288	463	694	998	1,381
1995	263	423	638	919	1,277	286	460	694	999	1,389
1996	266	431	653	943	1,331	282	456	691	998	1,409
1997	284	449	673	969	1,373	294	465	697	1,004	1,422
1998	293	476	700	1,013	1,439	299	487	715	1,035	1,471
1999	306	491	728	1,053	1,488	306	491	728	1,053	1,488

Middle earnings group

Year	Upper limit of—					Upper limit of—				
	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile
	In current dollars					In constant 1999 dollars				
1989	[1]169	248	355	502	655	[1]221	324	464	656	856
1990	[1]178	259	367	512	683	[1]222	323	457	638	850
1991	[1]188	268	378	523	707	[1]226	322	454	628	849
1992	[1]192	274	395	549	719	[1]225	321	462	643	842
1993	[1]195	281	405	564	756	[1]222	321	462	644	863
1994	192	281	402	580	771	214	314	449	648	861
1995	197	287	410	592	786	214	312	446	644	855
1996	204	294	420	605	813	216	311	445	640	861
1997	214	303	438	624	850	222	314	454	646	881
1998	228	316	460	654	888	233	323	470	668	908
1999	237	328	475	672	915	237	328	475	672	915

Lowest earnings group

Year	Upper limit of—					Upper limit of—				
	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile	First decile	First quartile	Second quartile (median)	Third quartile	Ninth decile
	In current dollars					In constant 1999 dollars				
1989	[1]60	121	[1]198	308	429	[1]78	158	[1]259	403	561
1990	[1]67	129	[1]207	320	462	[1]83	161	[1]258	398	575
1991	[1]70	134	[1]211	327	475	[1]84	161	[1]253	393	570
1992	[1]72	141	[1]215	343	496	[1]84	165	[1]252	401	581
1993	[1]75	144	[1]223	358	514	[1]86	164	[1]254	409	587
1994	78	139	236	362	521	87	155	263	404	582
1995	81	144	243	371	538	88	157	264	403	585
1996	84	150	252	382	558	89	159	267	404	591
1997	88	158	261	392	571	91	164	270	406	592
1998	92	167	276	411	599	94	171	282	420	612
1999	96	178	289	424	620	96	178	289	424	620

[1] The 10th-percentile earnings figure for each earnings group and the median weekly earnings figure for the lowest earnings group have been adjusted to make them more comparable with earnings data collected beginning in 1994. (See notes 13 and 15 in the text.)

NOTE: The Consumer Price Index research series using current methods (CPI-U-RS) was used to convert current dollars to constant dollars for 1989–99.

Table 5. Selected percentile ratios, by earnings group, annual averages, 1989–99

Year	Highest earnings group			Middle earnings group			Lowest earnings group		
	90–10	90–50	50–10	90–10	90–50	50–10	90–10	90–50	50–10
1989	[1]4.51	1.94	[1]2.33	[1]3.88	1.85	[1]2.10	[1]7.15	[1]2.17	[1]3.30
1990	[1]4.46	1.88	[1]2.38	[1]3.84	1.86	[1]2.06	[1]6.90	[1]2.23	[1]3.09
1991	[1]4.52	1.90	[1]2.38	[1]3.76	1.87	[1]2.01	[1]6.79	[1]2.25	[1]3.01
1992	[1]4.73	1.93	[1]2.45	[1]3.74	1.82	[1]2.06	[1]6.89	[1]2.31	[1]2.99
1993	[1]4.72	1.97	[1]2.40	[1]3.88	1.87	[1]2.08	[1]6.85	[1]2.30	[1]2.97
1994	4.79	1.99	2.41	4.02	1.92	2.09	6.68	2.21	3.03
1995	4.86	2.00	2.43	3.99	1.92	2.08	6.64	2.21	3.00
1996	5.00	2.04	2.45	3.99	1.94	2.06	6.64	2.21	3.00
1997	4.83	2.04	2.37	3.97	1.94	2.05	6.49	2.19	2.97
1998	4.91	2.06	2.39	3.89	1.93	2.02	6.51	2.17	3.00
1999	4.86	2.04	2.38	3.86	1.93	2.00	6.46	2.15	3.01

[1] The percentile ratios reflect adjustments to the 10th-percentile earnings figure for each group and the 50th-percentile earnings figure for the lowest earnings group. These adjustments make data more comparable with those beginning in 1994. (See notes 13 and 15 in the text.)

dispersion is to track various ratios of percentiles over time.[14] To construct some of these ratios, the weekly earnings values associated with various percentiles (the upper limits of various deciles and quartiles) were computed for all workers and for each of the three separate earnings groups from 1989 to 1999.[15] (See tables 3 and 4.) We then calculated 90th-to-10th, 90th-to-50th, and 50th-to-10th percentile ratios (the upper limit of the ninth decile divided by the upper limit of the first decile, and so forth) for all workers and for each of the three earnings groups for every year during the period.

Chart 3 suggests that earnings dispersion overall changed very little during the 1990s (after adjustment; see note 13). The 90th-to-10th percentile ratio held fairly steady. The 90th-to-50th percentile ratio edged up, while the 50th-to-10th ratio edged down, as shown in chart 4. Thus, those at the top and those at the bottom of the distribution did better relative to those in the middle, but exhibited little change relative to each other. (Percentile ratios based on unadjusted data also are included in charts 3 and 4, to illustrate that the interpretation of recent trends in earnings dispersion is sensitive to the data used.) These findings seem to be consistent with the earnings changes previously noted for the three earnings groups, in that median weekly earnings rose for the lowest and highest earnings groups, but held steady for workers in the middle. The most notable feature of recent earnings patterns, including changes in earnings dispersion, is the relatively strong earnings growth among the lowest paid workers in 1998 and 1999.

Within the earnings groups themselves, growing dispersion was most evident in the highest earnings group. For example, the 90th-to-10th percentile ratio increased markedly over the entire 1989–99 period, reflecting strong real earnings increases among the highest paid workers in the group. It is notable that there was a slight decline in the 90th-to-10th ratio near the end of the period, because earnings advanced relatively sharply for those at the bottom rung of the highest earnings group over the 1997–99 period. (See table 5.)

The middle earnings group showed less evidence of growing earnings dispersion than the highest earnings group, and in the lowest earnings group, earnings dispersion actually declined. It is worth noting again that the lower paid workers in each of these groups also saw their earnings rise slightly from 1997 to 1999.

WAGE AND SALARY EMPLOYMENT GREW SUBSTANTIALLY from 1989 to 1999. Nearly all of the growth was concentrated among relatively high- and low-paid workers, with the strongest job growth occurring in the highest earnings group. There was scant employment growth among workers with midlevel wages. Real median weekly earnings for the highest and lowest earnings groups also showed some improvement over the entire period, largely due to the marked acceleration in earnings growth toward the end of the decade. It is notable that the earnings growth was somewhat more pronounced among workers in the lowest earnings group. Despite a similar pickup in real median weekly earnings in the middle earnings group in the late 1990s, earnings remained about unchanged over the entire period.

Among the more detailed occupation-industry classifications, there was little correlation between those that grew the fastest in terms of employment and those that registered rising wages. While some individual occupation-industry categories had both strong employment growth and strong earnings growth, others showed divergent employment and earnings trends, and still others showed declines in both employment and earnings. These widely different patterns were pervasive throughout the range of detailed occupation-industry categories analyzed.

Finally, given the distinct polarization in employment growth from 1989 to 1999 and the absence of substantial overall earnings growth, we examined the data for changes in the earnings dispersion. After adjusting for breaks in weekly earnings series associated with the redesign of the CPS in 1994, we did not discern a general rise in earnings dispersion over the 1989–99 period. □

Notes

[1] For an analysis of trends in various wage series from the Current Population Survey, the National Income and Product Accounts, and the Current Employment Statistics survey, see Katharine G. Abraham, James R. Spletzer, and Jay C. Stewart, "Why Do Different Wage Series Tell Different Stories?" *American Economics Association Papers and Proceedings*, May 1999, pp. 34–39.

[2] The official end of the last recession, as determined by the National Bureau of Economic Research (NBER), was March 1991. Under NBER's method for determining the length of an expansion or recession, the economic trough, in March 1991, would be counted as the first month in the current economic expansion. The economic peak (when it occurs) would be counted as the first month in the subsequent economic recession. The longest expansion on record, 106 months, occurred during the 1960s. As of December 1999, the current economic expansion also appears to have lasted 106 months.

[3] The CPS is a nationwide sample survey of approximately 50,000 households conducted for the Bureau of Labor Statistics by the Bureau of the Census. The CPS provides information about the employment status and demographic and socioeconomic characteristics of the civilian noninstitutional population aged 16 and older. The major gauge of employment growth is the Current Employment Statistics (CES) program, a BLS survey of more than 400,000 business establishments. However, this survey does not supply data on the occupational characteristics of employment, an essential feature of the research presented in this article. From March 1992 to December 1999, a period of sustained job growth following the 1990–91 recession, the CES survey showed a job gain of about 22 million, well above the 16½ million indicated by the CPS. (Both estimates are based on changes in seasonally adjusted data). Numerous conceptual and methodological differences between the two surveys could account for these differences in measured employment growth. For a recent study of this issue, see Mark Schweitzer and Jennifer Ransom, "Measuring Total Employment: Are a Few Million Workers Important?" *Economic Commentary* (Federal Reserve Bank of Cleveland, June 1999).

[4] See Randy E. Ilg, "The nature of employment growth, 1989–95," *Monthly Labor Review*, June 1996, pp. 29–36.

[5] Employment and earnings data analyzed in this article are based on the Outgoing Rotation Group files from the CPS. Median weekly earnings for *all* wage and salary workers, both full and part time, are analyzed, unless otherwise noted. Self-employed workers are excluded, regardless of whether their businesses are incorporated. (Earlier research by Ilg, cited in note 4, analyzed *total* employment, including the self-employed.) The year 1989 was chosen as the beginning year for the analysis presented herein because labor market activity at the end of the 1980s resembled that of the late 1990s and also because 1989 was sufficiently removed from the influence of the recession that started in mid-1990.

[6] Some of the earnings data presented in the article have been adjusted for breaks in series associated with the introduction of the redesigned CPS in 1994. Adjustments were made to median weekly earnings for the lowest earnings group and for earnings at the 10th percentile for all workers and each of the three earnings groups. The rationale for making these adjustments is discussed in detail in notes 13 and 15.

[7] 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. The increase in real median weekly earnings in 1997–99 is particularly noteworthy. A change in real earnings can occur because either nominal wages or the rate of inflation (or both) changed. Throughout much of the 1990s, the annual rate of increase in the CPI-U-RS was about equal to that of nominal earnings. From 1997 to 1999, the rate of inflation was well below levels seen earlier in the decade, while the increase in nomi-

nal earnings improved. Other earnings measures, such as average weekly earnings for private production or nonsupervisory workers from the CES program, showed a similar pattern.

[8] For the purposes of this article, full-time workers are those who usually work 35 hours or more on their principal job.

[9] For additional information on the employment diversity in the services industry, see Joseph R. Meisenheimer II, "The services industry in the 'good' versus 'bad' jobs debate," *Monthly Labor Review*, February 1998, pp. 22–47.

[10] The methodology used was adopted from that employed in previous research on job growth. (See Ilg, "The nature of employment growth.") Earnings data for 1988 were chosen for purposes of ranking the individual occupation-industry categories, because that year was outside the period of study, but representative of the level of economic activity throughout much of the 1989–99 period. Similarly, data for 1988 were used as the basis for splitting employment into three groups of nearly equal size. The groups do not necessarily contain exactly one-third of wage and salary employment, because an occupation-industry category that fell on the dividing line between groups was not split, but rather, was included in the group into which most of its employment fell. Sensitivity testing has shown that ranking the occupation-industry categories by earnings from other years may influence those categories on the boundary of the major earnings groups. That is, some categories tend to move in or move out of the major earnings groups, based on which year is chosen for purposes of ranking. However, using earnings from other years to rank the occupation-industry categories also shows that the trends in employment growth for all earnings groups were similar to those presented in this analysis, although the magnitudes of the changes differed somewhat.

[11] Occupation-industry categories that had an employment base of less than 50,000 in either 1989 or 1999 are not shown separately in the table, because the earnings estimates for relatively small groups are generally associated with relatively large standard errors. Employment and earnings data for these categories with fewer workers are, however, included in the totals for the highest, middle, and lowest earnings groups. Combined, the 21 occupation-industry categories (out of the total of 90) accounted for a negligible portion of the net increase in employment between 1989 and 1999. Data are ranked in descending order by percent change in employment. The annual estimates of employment and earnings for the nine major occupations and 10 major industries from 1989 to 1999, as well as the 90 individual data series, are available from the authors upon request.

[12] The reader is cautioned that the middle earnings group is not intended to represent the "middle class." While many studies have documented the erosion of the number of persons, households, or families in the "middle" of the distribution of incomes (a trend often characterized as the "declining middle class"), this article does not attempt to shed further light on that issue.

[13] In January 1994, a new questionnaire and survey methodology were introduced into the CPS. The survey questions on earnings were modified substantially, to improve the quality of the data. While estimates of *overall* median weekly earnings were not materially affected by the redesigned survey, the impact on earnings data for persons at the bottom of the weekly earnings distribution was significant. In particular, changes to the survey in 1994 led to lower reported earnings for relatively low-paid workers, compared with pre-1994 estimates. To account for this break in the various series, median weekly earnings figures for the lowest earnings group over the 1989–93 period have been adjusted to reflect the methodology used in 1994 and later years. After adjustment, the real median weekly earnings for the lowest earnings group for the years 1989–93 are somewhat lower than the unadjusted figures for those years, resulting in a slightly larger percent change over the entire 1989–99 period (11.6 percent, as opposed to 7.8 percent before adjustment). Because of the very small sample sizes, no attempt was made to adjust the earnings series for the detailed occupation-industry categories in the lowest earnings group. (The adjustment factors were produced specifically for this article by Anne E. Polivka of the Bureau of Labor Statistics and were derived using methods she has developed as part of ongoing

research. See Anne E. Polivka, "Using Earnings Data from the Current Population Survey after the Redesign," Bureau of Labor Statistics, working paper 306, January 1999. The adjustment factors are available from the authors upon request.)

[14] Percentiles for any wage or income distribution are calculated by ranking earnings observations from lowest to highest and then determining the earnings level for the upper limit of a given percentile cutoff. For example, 10 percent of earnings observations are below the upper limit of the 10th percentile (or first decile). For a recent analysis and discussion of wage inequality, see, for example, Paul Ryscavage, *Income Inequality in America* (New York, M.E. Sharpe, 1998); see also Jared Bernstein and Lawrence Mishel, "Has wage inequality stopped growing?" *Monthly Labor Review*, December 1997, pp. 3–16.

[15] As explained in note 13, in this article earnings data for the 1989–93 period have been adjusted (where applicable) for breaks in series associated with the redesign of the CPS in 1994. With respect to various percentiles, research has shown that the upper limit of the first decile for all workers was significantly lower, as measured under the redesigned survey; hence, data for the 1989–93 period have been adjusted (downward) to make them more comparable. In addition, the first decile was adjusted for each of the three individual earnings groups. As mentioned in note 13, the 50th percentile (median) for the lowest earnings group also required adjustment.

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