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# Changes in the Distribution of Workers' Annual Earnings Between 1979 and 2007

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# Changes in the Distribution of Workers' Annual Earnings Between 1979 and 2007

## **Abstract**

[Excerpt] This Congressional Budget Office (CBO) paper, which was prepared at the request of the Senate Committee on Finance, documents changes in the annual earnings of workers ages 25 to 54 between 1979 and 2007. CBO's analysis compares the distribution of earnings for male and female workers and documents changes in the annual earnings of workers with very high earnings. The analysis also examines changes in earnings mobility (the rate at which workers move from one position in the distribution to another) and earnings variability (the extent to which a worker's earnings change from one year to the next). In keeping with CBO's mandate to provide objective, impartial analysis, this paper makes no recommendations.

## **Keywords**

workers, earnings, gender, mobility, variability, Congressional Budget Office

## **Comments**

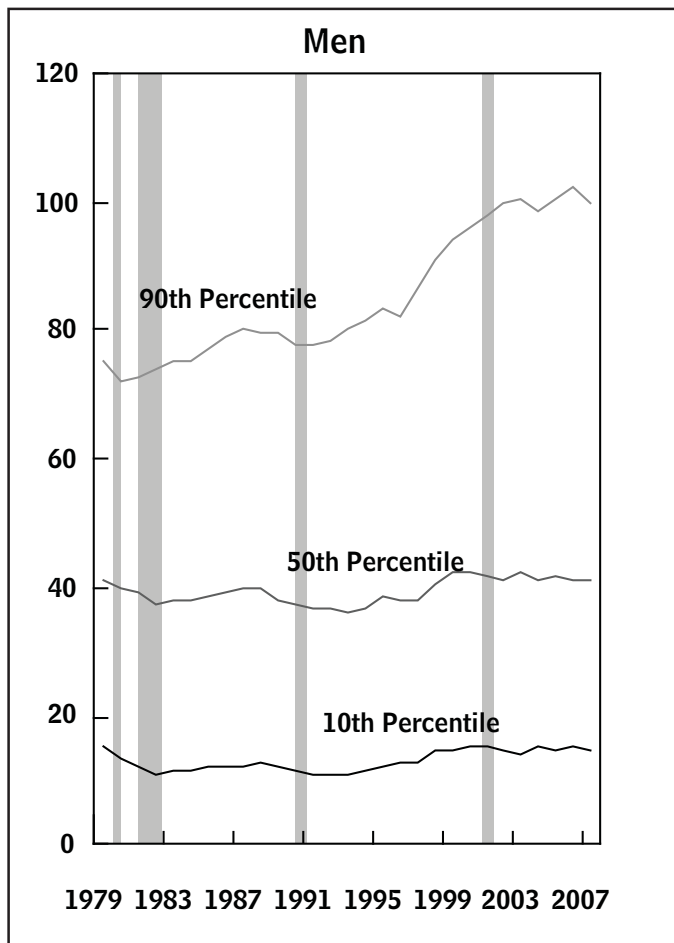
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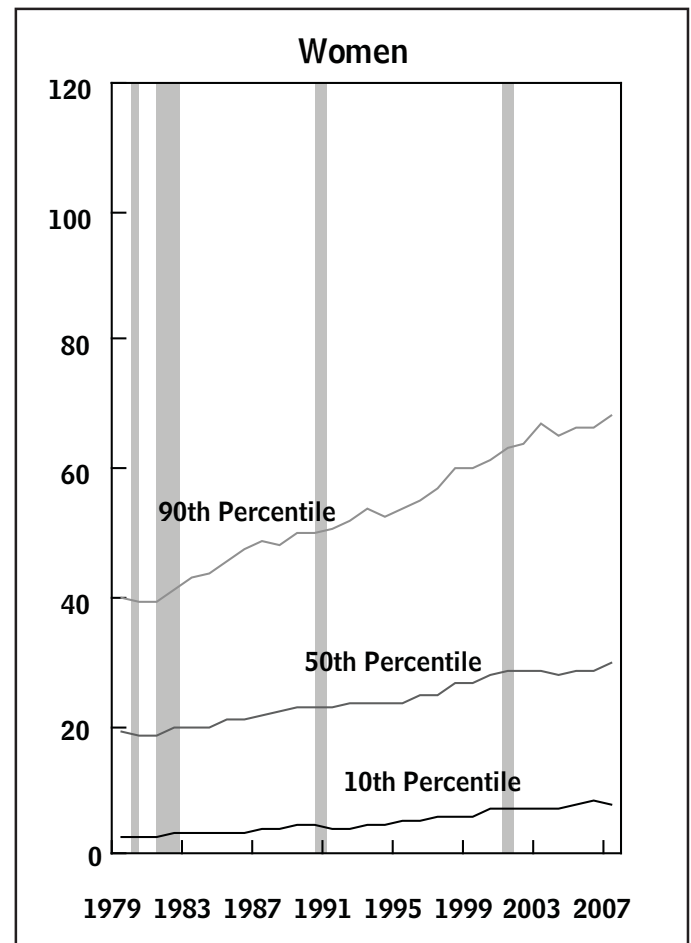
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# Changes in the Distribution of Workers' Annual Earnings Between 1979 and 2007

Thousands of 2007 Dollars



Thousands of 2007 Dollars



Real Annual Earnings at Selected Percentiles of  
Men's and Women's Earnings Distributions



OCTOBER 2009





# **Changes in the Distribution of Workers' Annual Earnings Between 1979 and 2007**

October 2009

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## Notes

Many of the figures in this report use shaded vertical bars to indicate periods of recession. (A recession extends from the peak of a business cycle to the trough.)

All earnings, which were adjusted for inflation using the price index for personal consumption expenditures, are reported in 2007 dollars.

Supplemental data for this analysis will be available on CBO's Web site ([www.cbo.gov](http://www.cbo.gov)).

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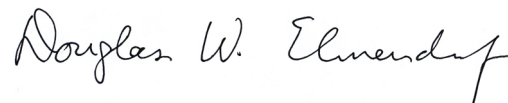


# Preface

**T**his Congressional Budget Office (CBO) paper, which was prepared at the request of the Senate Committee on Finance, documents changes in the annual earnings of workers ages 25 to 54 between 1979 and 2007. CBO's analysis compares the distribution of earnings for male and female workers and documents changes in the annual earnings of workers with very high earnings. The analysis also examines changes in earnings mobility (the rate at which workers move from one position in the distribution to another) and earnings variability (the extent to which a worker's earnings change from one year to the next). In keeping with CBO's mandate to provide objective, impartial analysis, this paper makes no recommendations.

Molly Dahl and Jonathan A. Schwabish wrote the paper under the guidance of Joyce Manchester and Bruce Vavrichek. Helpful comments came from Nabeel Alsalam, Patrick Bernhard, David Brauer, Jeffrey Kling, Ben Page, and Frank Sammartino, all of CBO; from Paul Cullinan and Ralph Smith, formerly of CBO; and from Lawrence Katz of Harvard University and Alan B. Krueger of Princeton University, currently serving as the Department of the Treasury's Assistant Secretary for Economic Policy. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.)

Leah Mazade edited the report, and Christine Bogusz proofread it. Maureen Costantino designed the cover and prepared the paper for publication, with assistance from Holly Battelle, Priscila Hammett, and Christian Howlett. Lenny Skutnik produced the initial copies, Linda Schimmel coordinated the print distribution, and Simone Thomas prepared the electronic version for CBO's Web site.



Douglas W. Elmendorf  
Director

October 2009







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# Changes in the Distribution of Workers' Annual Earnings Between 1979 and 2007

## Introduction and Summary

Understanding how the annual earnings of workers have changed over time is integral to projecting possible changes in such earnings in the future and considering government tax and spending policies that affect workers. This Congressional Budget Office (CBO) paper documents changes in workers' annual earnings; however, it does not delve deeply into the causes of those changes or the possible implications for government policy.

The paper first describes changes between 1979 and 2007 in the annual (inflation-adjusted) earnings of workers ages 25 to 54. CBO found that men with relatively low, median, and relatively high earnings (specifically, men at the 10th, 50th, and 90th percentiles of their earnings distribution) earned more than women in the same position of their own earnings distribution in 2007, and that those differences were smaller in 2007 than in 1979 (see Figure 1 on page 20). (Box 1 presents a primer on some of the measurement concepts used in this paper.) CBO also compared the differences in earnings between low, median, and high earners of the same sex in a given year. For men, the ratio of the earnings of high earners to those of median earners was larger in 2007 than in 1979, whereas the earnings ratio for median and low earners was roughly the same in the two years. For women, in contrast, the ratio of the earnings of high earners to those of median earners was roughly the same in 2007 as it was in 1979, but the earnings ratio for median and low earners was smaller in 2007 than it was in 1979.

This paper also documents changes between 1989 and 2005 in the annual (inflation-adjusted) earnings of workers ages 25 to 54 with very high earnings. (Examining workers with earnings at the very top of the distribution requires a different data set, one that does not span all of

the years covered by the data set used in the first part of the paper.) CBO found that men with earnings at the top of their earnings distribution (those at the 95th and 99th percentiles) earned more than women at the top of their distribution in each year, although that difference declined over time. The earnings of men and women at the top of their earnings distributions were higher in 2005 than they were in 1989, and the increase for workers at the 99th percentile of the distribution was larger than for workers at the 95th percentile. Also, the share of earnings held by workers in the top 5 percent of the distribution increased between 1989 and 2005.

Additionally, CBO examined changes in earnings mobility and variability. Dividing the population into five groups based on earnings, CBO found that the fraction of people moving from one group to another (for example, from the bottom fifth of the distribution to the top fifth) over various five-year spans was roughly unchanged from 1989 to 2005 for both men and women. Slightly more than one-quarter of men and of women experienced increases or decreases in earnings of 50 percent or more between 2004 and 2005. The percentage was similar for year-over-year changes throughout the 1989–2005 period.

There are several points to keep in mind in considering CBO's findings. First, this paper examines annual earnings, not hourly wages. People's annual earnings are determined both by their earnings per hour and by how many hours they work each year. Second, people's annual earnings are not necessarily the entirety of their compensation. In focusing on earnings for its analysis, CBO did not take into account other forms of compensation, such as defined-benefit retirement plans, employers' contributions to 401(k) plans, or employment-based health

**Box 1.****A Primer on Measuring Earnings Dispersion, Mobility, and Variability**

This report examines men and women at selected percentiles of their respective earnings distribution. To make that idea more concrete, consider 200 workers—100 men and 100 women—ages 25 to 54 on an auditorium stage. The men line up separately from the women; each group arranges itself, from left to right, by people's earnings. Thus, the worker with the lowest earnings stands closest to the left wall of the stage, and the worker with the highest earnings stands closest to the right wall. Each line, or array, of workers represents the entirety of the earnings distribution of men or women ages 25 to 54 in a given year.

The 10th worker from the left in either line has relatively low earnings. That man or woman is at the 10th percentile of his or her respective earnings distribution, which means that 10 percent of the workers of the same sex have the same or lower earnings and 90 percent have higher earnings. The worker standing in the very middle of each line has earnings in the middle, or at the median, of his or her earnings distribution. That worker is at the 50th percentile of the distribution (50 percent of workers of the same sex have the same or lower earnings and 50 percent have higher earnings), and so on.

In its analysis, the Congressional Budget Office (CBO) found that in 2007, men tended to earn more than women. Consider the 200 men and women

standing in two lines on the stage in the auditorium. They stand shoulder to shoulder, and the line of women is in front of the line of men. The 10th man from the left (who is at the 10th percentile of the earnings distribution of men) had higher earnings than the woman standing directly in front of him (who is at the 10th percentile of the earnings distribution of women). The same is true of the men and women at the 50th and the 90th percentiles.

CBO's analysis also considered changes in the dispersion of earnings. In 2007, the earnings of the man at the 90th percentile of his earnings distribution were about 7 times those of the man at the 10th percentile, and the earnings of the woman at the 90th percentile of her earnings distribution were 8.5 times those of the woman at the 10th percentile. Consider the people standing on the stage again, but now they have spread out across the stage in such a way that the man earning \$10,000 is twice as far from the wall on the left as the man earning \$5,000. The women have spread out in the same way. The man at the 90th percentile is seven times farther from the wall on the left than the man at the 10th percentile; the woman at the 90th percentile is 8.5 times farther than the woman at the 10th percentile.

The results of CBO's analysis that have been discussed here thus far are based on a "snapshot" of the

Continued

insurance. (Comprehensive data on compensation for individuals are not generally available over long periods.) Third, annual earnings do not necessarily represent all of the resources available to workers. Many people receive income from unemployment compensation, child support, or other sources over the course of a year. Also, many people share resources with family members, and some people have savings on which they can rely. Fourth, CBO excluded people who had no earnings over the course of a year and those who had earnings only from self-employment. People who had both earnings and income from self-employment were included in the anal-

ysis, but their income from self-employment was not considered. Finally, CBO's restriction of the analysis to people ages 25 to 54 lessened the effects that individuals' decisions about educational attainment and retirement might have on the study's results.

### **Trends in Earnings Between the 10th and 90th Percentiles of the Earnings Distribution**

For this part of its analysis, CBO examined trends in the annual earnings of workers ages 25 to 54 between 1979

**Box 1.****Continued****A Primer on Measuring Earnings Dispersion, Mobility, and Variability**

workforce in 2007. To follow the same people over time, CBO used a different data set. That information allowed analysts to document two longitudinal concepts of changes in earnings: earnings mobility and earnings variability.

The example of the auditorium stage remains useful. Now, all of the seats in the audience are full of people of all ages. In 2000, all the working men and women who are 25 to 54 years of age are invited to come up on stage and form two lines—the men in one and the women in the other, ordered as before (from left to right) by the amount of their earnings. Each person is given a placard that has “2000” written on it as well as a number indicating whether they are in the lowest 20 percent of the distribution, between the 21st and 40th percentiles, and so on. (That assignment divides the earnings distributions into fifths, or quintiles.) In 2005, all of the same people return to the auditorium—audience members as well as people who were on the stage—and all the working men and women ages 25 to 54 are again invited to come up onto the stage. Some of the people on stage will have placards from 2000; some will not. In particular, people who were younger than 25 in 2000 or were not working then will not have placards. Some of the people remaining in the audience will have placards from 2000 as well; those people are now either beyond the

25-to-54 age range of people invited up on stage or were working in 2000 but are not working in 2005.

The men and women on the stage again form separate lines, by increasing order of their earnings in 2005, and each is given a placard that has “2005” and their position in the distribution on it. All of the people that have placards from both 2000 and 2005 step forward and are asked to examine the changes in their quintiles between the two years. The results illustrate the idea of earnings mobility, or how people move around in the earnings distribution relative to each other.

Keeping the men and women separate, CBO found that about half of the men and half of the women in its sample were in the same segment of the earnings distribution in 2005 as they had been in 2000.

The second longitudinal concept of changes in earnings, that of earnings variability, does not directly relate to the auditorium full of workers. Earnings variability, as CBO defined it for this analysis, captures the fraction of workers that experienced a large change in their earnings from one year to the next. About 27 percent of men and 29 percent of women experienced increases or decreases in earnings of 50 percent or more between 2004 and 2005.

and 2007, focusing on workers at the 10th, 50th, and 90th percentiles of the earnings distribution. The data CBO used were drawn from the Census Bureau's Current Population Survey (CPS), which contains information on the characteristics of workers and the number of hours they work.<sup>1</sup> (The appendix discusses the CPS, including the limitations that it presented for CBO's analysis.) Both 1979 and 2007 represent a trough in the unemployment rate of people ages 25 to 54, which makes results from

those years roughly comparable. More recent data, for 2008, are also available (see Box 2).

CBO's analysis centered on individuals with wage and salary earnings; it excluded people who had no earnings as well as those who had earnings only from self-employment. All earnings, which were adjusted for inflation using the price index for personal consumption expenditures, are reported in 2007 dollars.

**Comparing Trends in the Earnings of Men and Women Between 1979 and 2007**

As a point of reference, in 2007, workers at the 10th percentile of the combined earnings distribution of men

1. CBO found patterns for men's and women's earnings in the CPS data that were similar to those found in the other data set used in this paper, the Continuous Work History Sample maintained by the Social Security Administration (see the appendix for more details).

**Box 2.**

**Earnings of Men and Women in 2008**

Using the most recent data available, the Congressional Budget Office found that the real (inflation-adjusted) annual earnings of men and women at the 10th, 50th, and 90th percentiles of their earnings distributions declined between 2007 and 2008. In 2007, the unemployment rate for people ages 25 to 54 was 3.7 percent, a trough in the unemployment rate for that age group; in 2008, the rate was 4.8 percent. All indications are that the unemployment rate for that group will be higher still in 2009.

The annual earnings of men at the 10th percentile of their earnings distribution were 14 percent lower in 2008 than they were for their counterparts at the 10th percentile in 2007. That change represents the largest year-to-year decline in earnings for that group between 1979 and 2008. Men at the median of the earnings distribution earned \$39,700 in 2008, 3 percent less than their counterparts earned in the previous year. The earnings of men at the 90th percentile in 2008 were \$96,800, also 3 percent lower than their counterparts' earnings in 2007.

The annual earnings of women at the 10th, 50th, and 90th percentiles of their earnings distribution also declined between 2007 and 2008. The earnings of women at the 10th percentile were \$7,700 in 2008, 4 percent lower than those of women at the same point in the distribution in 2007. The annual earnings of women at the median and the 90th per-

centile declined by 3 percent and 2 percent, respectively, between 2007 and 2008.

**Real Annual Earnings of Workers at Selected Percentiles of the Earnings Distribution, by Sex**

(2007 dollars)

	2007	2008	Percentage Change
<b>All Workers</b>			
10th Percentile	10,800	9,700	-10
50th Percentile	35,000	33,900	-3
90th Percentile	85,000	83,200	-2
<b>Men</b>			
10th Percentile	14,600	12,600	-14
50th Percentile	41,000	39,700	-3
90th Percentile	100,000	96,800	-3
<b>Women</b>			
10th Percentile	8,000	7,700	-4
50th Percentile	30,000	29,000	-3
90th Percentile	68,000	66,800	-2

Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Earnings were adjusted for inflation using the price index for personal consumption expenditures and rounded to the nearest \$100.

and women earned \$10,800; those at the median, or 50th percentile, earned \$35,000; and those at the 90th percentile earned \$85,000 (see Table 1 on page 14).

**Men and Women at the Median.** In contrast to the annual earnings of men at the median of their earnings distribution—which, in inflation-adjusted terms, were the same in 2007 as for their counterparts in 1979—the annual earnings of women at the median of their distribution were 60 percent higher in 2007 than for their counterparts in 1979 (see Table 1 on page 14 and Figure 2 on page 21).

The earnings of men at the median of their earnings distribution followed the ups and downs of the business cycle: That is, they fell during recessions and in the years surrounding such downturns, and they rose during expansions—periods of stronger economic growth (see Figure 2). During the recessions in the early 1980s, the inflation-adjusted earnings of men at the median of their earnings distribution dropped, and although those earnings increased over the next several years, the upswings were offset by subsequent declines between 1988 and 1992, a period that included another recession. The earnings of men at the median of the distribution increased



again between 1994 and 2000 (a period of relatively strong economic growth); they remained relatively unchanged between 2001 and 2007.

In contrast to the pattern seen for men, the inflation-adjusted earnings of women at the median of their earnings distribution rose at a relatively steady pace between 1979 and 2000 (see Figure 2). That increase was driven in part by substantial increases in the number of hours women worked. In 1979, 67 percent of women who had earnings near the median of their earnings distribution worked full-time for the entire year; in 2000, 81 percent of women who had earnings near the median were full-time, full-year workers (see Table 2 on page 15). (For this analysis, CBO defined full-time, full-year employment as usually working 35 or more hours per week and working at least 50 weeks of the year.) Between 2000 and 2007, the rise in the earnings of women at the median of their distribution slowed.

**Men and Women at the 10th Percentile.** The annual earnings of men at the 10th percentile of their earnings distribution in 2007 were \$14,600, an amount slightly smaller than the inflation-adjusted earnings of their 1979 counterparts (see Table 1 on page 14). In contrast, the annual earnings of women at the 10th percentile of their distribution in 2007 were \$8,000, more than three times the earnings of their 1979 counterparts.

The earnings of men at the 10th percentile between 1979 and 2007 tended to be more responsive to changes in economic conditions than the earnings of men at the 50th percentile. Nevertheless, the cumulative change in earnings between 1979 and 2007 for both groups was quite similar (see Figure 2 on page 21).

The tripling of earnings for women at the 10th percentile of their distribution over the 1979–2007 period was spurred by substantial increases in the number of hours that women in that group worked. In 1979, 4 percent of women at the 10th percentile of their earnings distribution were working full-time all year long; by 2007, that figure had risen to 18 percent (see Table 2 on page 15).

**Men and Women at the 90th Percentile.** The earnings of men and women at the 90th percentile of their respective earnings distributions were higher in 2007 than they were for their counterparts in 1979. Men at the 90th percentile of their distribution in 2007 earned \$100,000—33 percent more than the inflation-adjusted earnings of

their 1979 counterparts. Women at the 90th percentile of their distribution in 2007 earned \$68,000, or 71 percent more than their 1979 counterparts earned.

Much of the cumulative increase in earnings between 1979 and 2007 for men at the 90th percentile can be attributed to a rise in their earnings during the late 1990s (see Figure 2 on page 21). In contrast, the cumulative increase in earnings for women at that percentile over the same period resulted from more consistent year-over-year changes in earnings.

### Comparing Men's and Women's Earnings in 2007

The annual earnings of men at the 10th, 50th, and 90th percentiles of their earnings distribution in 2007 were \$14,600, \$41,000, and \$100,000, respectively. The annual earnings of women at the same relative positions of their own earnings distribution were \$8,000, \$30,000, and \$68,000 (see Table 1 on page 14). That is, the earnings of men were 1.8, 1.4, and 1.5 times those of their counterpart women.

Men's annual earnings over the 1979–2007 period tended to be higher than women's in part because men tended to work more hours over the course of a year than women did (see Table 2 on page 15). Not only were men more likely to be employed full-time for the entire year, but among workers who reported full-time, full-year employment, the average number of hours worked was generally somewhat greater among men than among women.<sup>2</sup> That finding also held true among people who reported part-time or part-year employment: Men generally worked more hours over the course of a year than did women.

The differences between men and women in the number of hours worked over the course of a year do not fully account for the differences between their annual earnings. Even among those who worked a similar number of hours, men tended to earn more than women. To put it another way, the hourly wage of men tended to be higher than that of women. The differences between men's and women's hourly wages may be due to differences in education, experience in the labor force, the occupation or industry in which people worked, preferences or tastes (say, for relatively dangerous work, which may pay more,

2. CBO calculated the number of hours worked per year by multiplying the usual hours worked per week by the weeks worked per year.

all else being equal), discrimination, or other factors. A thorough analysis of factors that contribute to differences in earnings is outside the scope of this paper.<sup>3</sup>

### Changes in the Dispersion of Men's and Women's Earnings Between the 10th and the 90th Percentiles of Their Earnings Distributions

In 2007, the earnings of men at the 90th percentile of the distribution were about seven times those of men at the 10th percentile (see the ratios in Table 1 on page 14). That relationship represented an increase in dispersion over that existing in 1979, when the earnings of men at the 90th percentile of the distribution were five times those of men at the 10th percentile.

A widening in the upper portion of the distribution of men's earnings was the major contributor to the widening of earnings between the 90th and 10th percentiles. Dispersion in the lower portion of the distribution of men's earnings in 1979 was slightly less than it was in 2007—that is, the earnings of men at the 50th percentile of their earnings distribution were 2.7 times those of men at the 10th percentile in 1979, compared with 2.8 times in 2007 (see Table 1). In contrast, the earnings of men at the 90th percentile of their distribution in 1979 were 1.8 times those of men at the 50th percentile; by 2007, that gap had widened to 2.4 times.

Comparing dispersion in the bottom half of the men's earnings distribution in 2007 with that prevailing in 1979 masks some of the underlying changes in dispersion over time. For instance, from 1979 to 1982 and again from 1989 to 1992, the earnings of men at the 10th percentile of the distribution declined by more than did the earnings of those at the 50th percentile (see Figure 2 on page 21); the larger drop led to a widening of the dispersion in the bottom half of the distribution during those times (see Figure 3 on page 22). Conversely, between 1993 and 1998—a period of relatively strong economic growth—the earnings of men at the 10th percentile of the distribution increased by more than did those of men at the 50th, leading to a narrowing of the dispersion in the bottom half of the distribution during that time.<sup>4</sup>

3. See Joseph G. Altonji and Rebecca M. Blank, "Race and Gender in the Labor Market," in Orley Ashenfelter and David Card, eds., *Handbook of Labor Economics*, vol. 3C (New York: Elsevier, 1999), pp. 3143–3259.

Among women, a steady narrowing occurred between 1979 and 2007 in the dispersion of earnings between the 10th and 90th percentiles of their earnings distribution (see Table 1 on page 14). In 1979, women at the 90th percentile of the distribution earned 15.3 times more than women at the 10th percentile; by 2007, that ratio was 8.5 times.

The narrowing that occurred for women between the 10th and the 90th percentiles was driven by the substantial increase in earnings (208 percent) at the 10th percentile and the subsequent decline in dispersion in the bottom half of the distribution (see Figure 2 on page 21 and Figure 3 on page 22). In comparison, the changes in earnings for women at the median and for women at the 90th percentile of their earnings distribution were similar between 1979 and 2007 (see Figure 2). Relatively little change in dispersion was seen in the top half of the women's distribution (see Figure 3).

### Trends in Earnings at the Top of the Earnings Distribution

As another part of its analysis, CBO examined trends in the annual earnings of workers ages 25 to 54 between 1989 and 2005, specifically focusing on workers at the 90th percentile or higher of the earnings distribution. For those calculations, CBO used data from the Continuous Work History Sample (CWHHS) provided by the Social Security Administration, a data set that contains limited demographic information about the members of the sample beyond their age and sex. However, the data set does contain detailed information about the earnings of the very highest earners. (In contrast, the CPS—the data set used for the analysis in the previous section—does not.) The most recent year of data from the CWHHS available to CBO at the time of the analysis was 2005. Although that year does not represent a trough in the unemployment rate of people ages 25 to 54 (as 1989 does), the unemployment rate in 2005 was 4.1 percent, which is comparable to the unemployment rate of 4.2 percent for that age group in 1989. (The appendix discusses both data sets, including the limitations each presented for CBO's analysis.)

4. For a discussion of changes in the bottom half of the hourly wage distribution, see Congressional Budget Office, *Changes in Low-Wage Labor Markets Between 1979 and 2005* (December 2006).

### **Comparing Trends in the Earnings of Men and Women at the Top of Their Distributions Between 1989 and 2005**

As a point of reference, workers at the 95th percentile of the combined earnings distribution of men and women in 2005 earned \$103,200 (in 2007 dollars); those at the 99th percentile earned \$214,600 (see Table 3 on page 16).

**Men and Women at the 95th Percentile.** Men at the 95th percentile of their earnings distribution in 2005 earned \$123,400, an increase of 24 percent over their counterparts' inflation-adjusted earnings in 1989. Women at the 95th percentile of their earnings distribution earned \$79,400 in 2005—37 percent more than their counterparts earned in 1989 (see Table 3 on page 16).

The real annual earnings of women at the 95th percentile of their earnings distribution increased in every year between 1989 and 2005 (see Figure 4 on page 23). In contrast, the earnings of their counterpart men increased during the period of strong economic growth in the late 1990s but declined during the recessionary periods of the early 1990s and early 2000s.

**Men and Women at the 99th Percentile.** Men at the 99th percentile of their earnings distribution in 2005 earned \$278,100, and women at the 99th percentile of their distribution in that year earned \$139,100. Those amounts were 30 percent and 60 percent more, respectively, than the inflation-adjusted earnings of their counterparts in 1989 (see Table 3 on page 16).

The real annual earnings of women at the 99th percentile increased in almost every year between 1989 and 2005. One exception was between 2000 and 2002, around the time of the 2001 recession, when earnings for those women were relatively unchanged. In contrast, during that recession, the earnings of their counterpart men declined significantly (see Figure 4 on page 23).

### **Comparing Men's and Women's Earnings at the Top of Their Distributions in 2005**

Among the highest earners, men earned more than women. In 2005, the earnings of men at the 95th and 99th percentiles of their distribution were 1.6 and 2.0 times those of women in the same relative positions in their distribution. In comparison, in 1989, the earn-

ings of men at the 95th and 99th percentiles were 1.7 and 2.5 times those of women in the same relative positions. Those differences in men's and women's earnings in 2005 were smaller than the differences in 1989 (see Table 3 on page 16).

### **Changes in the Dispersion of Men's and Women's Earnings at the Top of Their Distributions**

In 2005, the earnings of men at the 99th percentile of their earnings distribution were 3.0 times those of men at the 90th percentile. That ratio represented an increase in dispersion compared with that in 1989, when the ratio was 2.8 times. In 2005, the earnings of women at the 99th percentile of their earnings distribution were 2.2 times those of women at the 90th percentile, representing an increase in dispersion, compared with the ratio in 1989 of 1.8 times (see Table 3 on page 16).

The patterns of changes in dispersion for men between the 99th and 90th percentiles of their earnings distribution and between the 99th and 95th percentiles were similar over the years 1989 to 2005. In both cases, dispersion tended to increase during periods of relatively strong economic growth and to decline during periods of relatively weak economic growth (see Figure 5 on page 24).

Like the patterns of changes in dispersion that CBO found in men's earnings, the patterns between the 99th and 90th percentiles and between the 99th and 95th percentiles of the women's earnings distribution were similar: Over the 1989–2005 period, dispersion was more likely to decline during times of relatively weak economic growth (for instance, during and immediately following the 2001 recession) and to increase during times of relatively strong economic growth (for instance, during the mid- to late 1990s) (see Figure 5).

### **Changes in Shares of Earnings**

The increase in earnings that CBO found at the top of the distribution was associated with an increase in the share of earnings received by those in the top 5 percent of the distribution.

The share of earnings going to men in the top 5 percent of the distribution—that is, to men whose earnings placed them at or above the 95th percentile of their earnings distribution—was larger in 2005 than in 1989. The top 5 percent of working men ages 25 to 54 received

22 percent of the earnings going to all men in that age range in 1989 and 26 percent of earnings going to all men in that age range in 2005.<sup>5</sup> In that year, the top 1 percent of working men—those with earnings of \$278,100 or more—garnered 13 percent of all earnings, up from 10 percent in 1989 (see Figure 6 on page 25).

The share of earnings that men with the highest earnings received followed the ups and downs of the business cycle to some extent between 1989 and 2005. The largest increases in the share of earnings going to the top 5 percent of workers occurred from the mid- to late 1990s, a period of relatively strong economic growth. During the periods of weaker economic growth that surrounded the recessions in 1990 to 1991 and in 2001, the share of earnings accruing to the top 5 percent of men remained unchanged or contracted.<sup>6</sup>

The share of earnings received by the top 5 percent of women, like that of their counterpart men, also rose between 1989 and 2005, although the share of earnings received by the top 5 percent of women was smaller than it was for men. The top 5 percent of women ages 25 to 54 with earnings received 17 percent of the earnings going to all women in that age range in 1989 and 20 percent of such earnings in 2005.<sup>7</sup> Those shares are about 5 to 7 percentage points lower than the share of earnings received by men in the top 5 percent of their earnings distribution. In 2005, the top 1 percent of women ages 25 to 54 with earnings received about 8 percent of the earn-

ings going to all women in that age group, up from about 5 percent in 1989 (see Figure 6 on page 25).

The share of earnings that the highest-earning women received was less sensitive to the business cycle between 1989 and 2005 than the corresponding share for men. During the period of rapid economic growth during the mid- to late 1990s, the share of earnings received by men in the top 5 percent of their distribution grew more quickly than the share of earnings received by women in the top 5 percent of their distribution. As the economy slowed during the 2001 recession, the share of earnings going to men in the top 5 percent of their earnings distribution fell more quickly than did the share of earnings going to women in the top 5 percent.

## Earnings Mobility and Earnings Variability

Comparing the earnings of people at selected points in the earnings distribution in one year with the earnings of their counterparts in another year does not capture whether a particular individual experiences gains or losses in his or her earnings over time. For example, CBO's finding that the earnings of men at the median of their distribution were, in inflation-adjusted terms, about the same in 2007 as they were in 1979 does not mean that men with median earnings in 1979 did not experience any gains or losses in earnings in the following years. To measure different aspects of changes in individuals' earnings from one year to another, CBO examined two distinct longitudinal concepts:

- *Earnings mobility*, which measures the probability that workers will change their position in the earnings distribution from one year to another (for example, the probability that a worker will move from the bottom part of the earnings distribution in one year to the top part of it in another); and
- *Earnings variability*, which measures the percentage change in a person's earnings from one year to the next.

Earnings mobility is a relative concept: Whether an individual changes position in the earnings distribution depends not only on the changes in his or her own earnings but on the changes in everyone else's earnings as well.

5. There were roughly 53 million men ages 25 to 54 working in 2005, so approximately 2.7 million of those men were in the top 5 percent of their earnings distribution. (Data were derived from a search of *Labor Force Statistics from the Current Population Survey*, Department of Labor, Bureau of Labor Statistics, September 23, 2009.)
6. According to one study, the share of earnings held by the top 1 percent of workers fell between 1937 and the mid-1960s before rising over the next 40 years. See Wojciech Kopczuk, Emmanuel Saez, and Jae Song, *Uncovering the American Dream: Inequality and Mobility in Social Security Earnings Data Since 1937*, Working Paper No. 13345 (Cambridge, Mass.: National Bureau of Economic Research, August 2007).
7. Roughly 45 million women ages 25 to 54 had earnings in 2005, and so about 2.3 million of those women were in the top 5 percent of their earnings distribution. (Data were derived from a search of *Labor Force Statistics from the Current Population Survey*.)

In contrast, earnings variability is not relative. How one person's earnings change from one year to the next is not directly related to changes in other people's earnings.

### Earnings Mobility

One method of measuring earnings mobility is to split the earnings distribution for one year into five equally sized pieces, or quintiles; group the lowest 20 percent of earners together, and so on, up the distribution; do the same for a later year; and determine what percentage of people switched groups.

**Earnings Mobility Between 2000 and 2005.** Table 4 on page 17 and Table 5 on page 18 show the probability of a person's moving from one quintile in 2000 to another quintile in 2005 as well as the probability of moving into or out of the very top of the distribution. For example, of the men who were in the middle quintile (the 41st to the 60th percentile) of their earnings distribution in 2000 and were working in 2005, 8 percent were in the lowest quintile, 42 percent were in the middle quintile, and 6 percent were in the highest quintile in 2005.<sup>8</sup>

About half of the men and half of the women in the bottom quintile of their respective earnings distributions in 2000 were in the bottom quintile again in 2005 (see Tables 4 and 5). The pace of mobility from the bottom of the distribution was approximately the same for both men and women: 28 percent of men and 30 percent of women moved up exactly one quintile, and an additional 22 percent of men (12 + 7 + 3) and 25 percent of women (14 + 7 + 4) moved up two or more quintiles between 2000 and 2005.

Workers were more likely to move up the distribution than to move down. Thirty percent of men and 30 percent of women were in a higher quintile of the distribu-

tion in 2005 than in 2000. Smaller percentages—17 percent of men and 19 percent of women—were in lower quintiles in 2005 than in 2000.

Workers who were in the top part of the distribution in 2000 tended to be there again in 2005. Eighty percent of men and 77 percent of women in the highest quintile in 2000 were also in the highest quintile in 2005. At the very top of the distribution, about 60 percent of the men and approximately the same percentage of the women who were in the top 1 percent of their respective distributions in 2000 were in the top 1 percent in 2005.

**Earnings Mobility by Age.** CBO found less mobility across quintiles of the earnings distribution between 2000 and 2005 among older workers—whose careers and earnings may be more stable—than among their younger counterparts (see Figure 7 on page 26). In other words, the probability of moving from one quintile of the earnings distribution in 2000 to another in 2005 declined with age. Among the youngest workers in the sample (those ages 25 to 29 in 2000 and 30 to 34 in 2005), almost 60 percent changed quintiles between 2000 and 2005. For the oldest workers in the sample (those ages 50 to 54 in 2005), roughly 40 percent changed quintiles between the two years.

### Trends in Earnings Mobility Between 1990 and 2005.

Mobility across quintiles of the earnings distribution was largely unchanged between 1990 and 2005 (see Figure 8 on page 27).<sup>9</sup> Among people ages 25 to 54 who were working in both 1990 and 1995, 47 percent were in a different quintile of the earnings distribution in 1995 than they were in 1990—the same rate of mobility found among people working in 2000 and 2005. Most workers who changed quintiles between 1990 and 1995 were moving up the earnings distribution.

CBO examined several different ways of constructing transition tables to analyze earnings mobility (see Box 3). Those methods produced results that were for the most part similar to the findings presented in this part of the analysis.

8. Although Table 4 on page 17 and Table 5 on page 18 (often called “transition matrices” or “transition tables”) are useful for examining earnings mobility, they have some shortcomings. Movement from the 59th to the 61st percentile and movement from the 41st to the 79th percentile are both measured as a transition from the middle to the fourth quintile, despite the difference in the magnitude of the two shifts. Movement from the 41st to the 59th percentile is not considered a transition; a person who makes such a move remains in the middle quintile. Transition tables also have an inherent asymmetry: Workers in the bottom quintile cannot move down any farther in the distribution, and workers in the top quintile cannot move any farther up.

9. As was the case between 2000 and 2005 (see Table 4 on page 17 and Table 5 on page 18), between 1990 and 1995 and between 1995 and 2000, the percentage of women changing quintiles was about 2 percentage points higher than the percentage of men making such a change.

**Box 3.****Alternative Methods for Analyzing Earnings Mobility**

In addition to its main conclusions regarding earnings mobility, the Congressional Budget Office (CBO) also examined mobility using three broad types of alternative techniques.

First, CBO examined how the earnings mobility results presented in Table 4 on page 17 and Table 5 on page 18 would change if those transition tables were defined in such a way that the percentage of people moving up the distribution had to equal the percentage of people moving down the distribution. For CBO's main analysis, a person's position in the earnings distribution in a given year was determined by comparing that person's earnings with the earnings of all other workers ages 25 to 54 in that year. That determination was made for workers in that age range in 2000 and again for workers in that range in 2005. Transitions were defined only for people who were in the sample in both years. Consider a man age 53 in 2000 who was at the 75th percentile of the earnings distribution. In 2005, that same man was 58 years old and outside the age range that CBO examined in this study. As such, his place in the earnings distribution in 2005 was not determined, and no transition

was defined for him. Transitions were not defined for workers who were age 50 or older in 2000, who were age 29 or younger in 2005, or who worked in one year but not the other. As a result, the percentage of people who moved up by at least one quintile did not have to equal the percentage of people who moved down by at least one quintile.

Restricting the earnings distribution in each year to include only those workers who were in the sample in both years (that is, who were ages 25 to 54 and working in both 2000 and 2005) results in slightly different outcomes. Under that method, for every person who moves up the distribution, one person must move down. The percentage of men who changed quintiles between 2000 and 2005 was about 1 percentage point lower than the main results presented in this report. The percentage of men who moved up at least one quintile was 6 percentage points lower, and the percentage who moved down at least one quintile was 5 percentage points higher. The differences for women were similar. That is, the percentage of women who changed quintiles between 2000 and

Continued

**Earnings Variability**

To examine the variability in workers' earnings, CBO calculated the percentage change in earnings from one year to the next for each worker and then grouped those changes into four separate categories: declines and increases greater than 50 percent and declines and increases between 25 percent and 50 percent.<sup>10</sup>

Between 1990 (the first year for which CBO calculated a change over the preceding year) and 2005, the frequency

of large—greater than 50 percent—changes in earnings tended to move in concert with economic conditions for both men and women (see Figure 9 on page 28). That is, during periods of relatively weak economic growth—in particular, during the recessions of 1990 to 1991 and 2001—the fraction of men and women that experienced large year-over-year gains in earnings tended to decline, and the fraction that experienced large year-over-year losses in earnings tended to increase.<sup>11</sup>

The fraction of men and women that experienced more modest changes in earnings—between 25 percent and 50 percent over the previous year—did not fluctuate

10. CBO published similar results in a paper titled *Recent Trends in the Variability of Individual Earnings and Household Income*, in June 2008. As CBO did for that analysis, it defined the percentage change for this study as  $((e_t - e_{t-1}) / ((e_t + e_{t-1}) / 2)) * 100$ , which allows years of zero earnings to appear in the calculation. See also Congressional Budget Office, "Trends in Earnings Variability Over the Past 20 Years," attachment to a letter to the Honorable Charles E. Schumer and the Honorable Jim Webb (April 17, 2007).

11. As noted in CBO's June 2008 publication on the variability of earnings, the results of that analysis are consistent with those in the economics literature, although explicit comparisons with other studies are complicated by differences in data and methodology.

**Box 3.**

Continued

**Alternative Methods for Calculating Transition Tables**

2005 was slightly lower than in the paper's main findings. That slight decline was the result of a drop in the percentage of women who moved up at least one quintile and an increase in the percentage of women who moved down at least one quintile.

Second, CBO examined how the trends in earnings mobility over time differed if the effects of changes in the age distribution of workers over time were removed. Consider a scenario in which there are a relatively large number of young workers. Younger workers tend to have higher rates of mobility than older workers have, so as that large group of young workers aged, mobility might decline. That decline might not represent an actual shift in the mobility of workers but rather the aging of younger workers and the associated decline in mobility. To investigate how the aging of the population might affect the trends in earnings mobility presented in this paper, CBO first fixed the age distribution of the sample population at its 2005 levels. As a second alternative, it adjusted the percentage change in earnings for each worker from one year to another using the median percentage change in earnings among the worker's age group.

Neither adjustment had much of an impact on the trends in estimated rates of mobility.

Third, CBO examined earnings mobility by using a three-year average (rather than a single year) of earnings. Using three years of earnings rather than one dampens the effects that temporary changes in a person's earnings (either unusually high or unusually low earnings in a single year) might have on estimated rates of mobility. That approach resulted in a slightly lower rate of overall mobility for men and virtually no change in the rate of overall mobility for women. For men, nearly all of the change in mobility between the one-year and the three-year-average approach came from a decline in the percentage of workers who moved up the earnings distribution. The percentage of men who moved down the distribution did not change substantially. For women, there was a slight decline in the percentage of workers who moved up the distribution, which was offset by a slight increase in the percentage of workers who moved down the distribution. The trends in mobility over time were similar to the main findings presented in the analysis.

much between 1990 and 2005. Approximately 7 percent of workers experienced such increases in earnings, and about 4 percent to 5 percent of workers experienced such declines.

### **Explaining Patterns in Earnings and in Dispersion**

The distribution of earnings in a particular year is a function of who works, how many hours they work, and the wage they earn per hour. Those three factors interact in a complex fashion. Whether or not an individual chooses to work depends in part on what that person is paid or believes he or she will be paid (the expected wage rate) and the value of the person's time outside of work. The number of hours people work during the year also depends on their hourly wage. If a person's hourly wage increases, he or she may prefer to work more, as each

hour spent not working becomes more costly (in terms of forgone earnings). Or the person may prefer to work less—to earn the same amount of money as before but by working fewer hours. In addition, a person's hourly wage depends not only on that individual's characteristics but also on the characteristics of all other workers and potential workers (the supply of labor) and the demand for those characteristics in the labor market.

### **Who Worked? The Composition of the U.S. Workforce**

Between 1979 and 2007, the composition of the U.S. workforce changed. Women constituted a larger share of the workforce in 2007 than they did in 1979. Also, the share of workers that were foreign born was larger in 2007 than in 1994, the first year for which data on immigration were available in the Current Population Survey. Moreover, workers in 2007 had, on average, more

education than workers had in 1979. Increased rates of disability and incarceration also played a role in changing the composition of the workforce.

**Women as a Share of the Workforce.** Between 1979 and 2007, the percentage of women who participated in the paid workforce increased markedly. Although approximately 85 percent of men ages 25 to 54 worked in each year between 1979 and 2007, the fraction of women in that age range who worked grew throughout the 1980s and 1990s, from 66 percent in 1979 to 76 percent in 2000. Between 2000 and 2007, the fraction of women working declined somewhat, falling to 74 percent in 2007 (see Figure 10 on page 29). As a result of the growing percentage of women who worked, women made up a larger share of the workforce in 2007 than they did in 1979 (see Table 6 on page 18).

**Foreign-Born People as a Share of the Workforce.** In 1994, about 11 percent of workers ages 25 to 54 were immigrants; in 2007, that percentage was nearly 17 percent (see Table 6). The growth in the fraction of workers that were immigrants was similar among men and women. In 1994, about 12 percent of working men were immigrants; in 2007, that fraction was about 19 percent. Among women, about 9 percent of working women in 1994 were immigrants; in 2007, about 15 percent were immigrants.<sup>12</sup>

**Workers' Educational Attainment.** The educational attainment of working men and women rose between 1979 and 2007, although the increase in attainment for women was greater than that for men (see Table 7 on page 19). In 1979, a smaller percentage of working women than men (41 percent compared with 48 percent) reported some education beyond high school. Between 1979 and 2000 those percentages increased for both groups. However, between 2000 and 2007, the percentage of working men who reported some education beyond high school did not increase much at all, whereas the percentage of working women who reported such

studies continued to increase. In 2007, a larger percentage of working women (67 percent) than of working men (58 percent) reported some education beyond high school.

**Disability.** For some people, income from disability benefits provides a viable alternative to low-paying jobs.<sup>13</sup> Between 1979 and 2007, the number of people who received disability benefits in a given year increased by roughly two and a half times. Nearly all of that increase occurred after 1990.<sup>14</sup>

**Incarceration.** Between 1979 and 2007, the rate of incarceration for men—that is, the number of male state or federal prisoners under state or federal jurisdiction as a percentage of all men who were U.S. residents—increased from 0.26 percent to nearly 1.0 percent.<sup>15</sup> Younger men—most, presumably, with skills and job qualifications that are well below average—account for most of the increase in the prison population and are, as a consequence, no longer able to participate in the workforce.<sup>16</sup>

### How Much Did Workers Work?

Men and women in the workforce in 2007 worked more over the course of the year than did their counterparts in 1979. The percentage of working men who were employed full-time for at least 50 weeks of the year increased from 78 percent in 1979 to 84 percent in 2007 (see Figure 11 on page 30). That increase in the percentage of men working on a full-time, full-year basis

12. In earlier work (see Congressional Budget Office, *The Role of Immigrants in the U.S. Labor Market*, November 2005), CBO concluded that “the arrival of large numbers of immigrants with little education probably slows the growth of the [hourly] wages of native-born high school dropouts, at least initially, but the ultimate impact on [hourly] wages is difficult to quantify.” For a general description of the foreign-born population, see Congressional Budget Office, *A Description of the Immigrant Population* (November 2004).

13. See David H. Autor and Mark G. Duggan, “The Growth in the Social Security Disability Rolls: A Fiscal Crisis Unfolding,” *Journal of Economic Perspectives*, vol. 20, no. 3 (Summer 2006), pp. 71–96.

14. See Table V.C5 in Social Security Administration, *The 2009 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* ([www.ssa.gov/OACT/TR/2009/lr5c5.html](http://www.ssa.gov/OACT/TR/2009/lr5c5.html)).

15. Personal communication to the Congressional Budget Office by staff members of the Department of Justice's Bureau of Justice Statistics, March 13, 2009.

16. The Census Bureau does not interview incarcerated individuals for the Current Population Survey. An increase in the percentage of people who were incarcerated would probably translate into an increase in the employment rate shown in Figure 10 because those who remained in the workforce would most likely have had a higher rate of employment than incarcerated individuals would have had if they had not been imprisoned. See Congressional Budget Office, *The Effect of Changes in Labor Markets on the Natural Rate of Unemployment* (April 2002).



was not the result of consistent year-over-year increases. Rather, the percentage of working men who worked full-time for at least 50 weeks of the year fell during periods of relatively weak economic growth and rose during periods of relatively strong growth. Among working women, the percentage employed on a full-time, full-year basis climbed from 51 percent in 1979 to 70 percent in 2007. Unlike the increase for men, that rise was the result of relatively consistent year-over-year increases.

### How Much Were Workers Paid per Hour?

For men, changes in the average hourly wage (adjusted for inflation) varied across the earnings distribution. The hourly wages of men near the 10th percentile of the earnings distribution were lower in 2007 than the hourly wages of their counterparts in 1979. In contrast, the hourly wages of men near the 90th percentile of the earnings distribution were higher in 2007 than those of their counterparts in 1979 (see Table 8 on page 19).

For women, hourly wages generally increased between 1979 and 2007. The rise in hourly wages over that period was larger for women near the 90th percentile of their earnings distribution than for women near the 50th percentile. It was also larger for women near the 50th percentile than for women near the 10th percentile (see Table 8).<sup>17</sup>

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17. The hourly wage discussed here is a calculated hourly wage (that is, annual earnings divided by the number of hours worked per year) rather than a reported hourly wage. As such, mismeasurement in the number of hours worked translates directly into mismeasurement in the hourly wage. See Nathaniel Baum-Snow and Derek Neal, "Mismeasurement of Usual Hours Worked in the Census and ACS," *Economics Letters*, vol. 102 (January 2009), pp. 39–41; and Greg J. Duncan and Daniel H. Hill, "An Investigation of the Extent and Consequences of Measurement Error in Labor-Economic Survey Data," *Journal of Labor Economics*, vol. 3, no. 4 (October 1985), pp. 508–532.

### The Importance of Hours Worked Versus Wages Earned

Because of the complex interplay between the number of hours people work and the hourly wage they earn, it is difficult to precisely break down the changes in earnings over time into the portion attributable to changes in hours and the portion attributable to changes in wages. As a result, most studies that CBO reviewed that attempt to explain changes in distributions over time focus on hourly wages alone. A thorough treatment of that literature is beyond the scope of this paper, although it is an avenue of research that CBO is pursuing.

The rise in earnings between 1979 and 2007 for women at the 10th percentile of their earnings distribution was due in large part to increases in the number of hours those women worked. CBO found that women at the 10th percentile of the earnings distribution in 1979 worked about 550 hours per year; their counterparts in 2007 worked more than twice as many hours, or about 1,210 hours per year.

The decline in earnings between 1979 and 2007 for men at the 10th percentile of their earnings distribution occurred in spite of an increase in the number of hours they worked. In 1979, men at the 10th percentile of the earnings distribution worked 1,700 hours per year; in 2007, they worked 1,790 hours per year, for an increase of about 5 percent. That boost in hours, coupled with the decline in the annual earnings of men at the 10th percentile, implies that those men experienced a decline in their real hourly wages.

Most men and women with relatively high earnings were working a relatively large number of hours in 1979. The increase in earnings between 1979 and 2007 is mostly attributable to increases in the real hourly wage they were paid rather than to further increases in the number of hours they worked.

**Table 1.****Real Annual Earnings of Workers at Selected Percentiles of the Earnings Distribution, by Sex**

	1979	1989	2000	2007	Percentage Change			
					1979-1989	1989-2000	2000-2007	1979-2007
<b>All Workers</b>								
Earnings (2007 dollars)								
10th percentile	5,800	6,900	10,600	10,800	19	54	2	86
50th percentile	29,500	30,600	35,300	35,000	4	15	-1	19
90th percentile	62,500	68,800	82,400	85,000	10	20	3	36
Ratios								
50th to 10th percentile	5.1	4.4	3.3	3.2	-14	-25	-3	-37
90th to 50th percentile	2.1	2.2	2.3	2.4	5	5	4	14
90th to 10th percentile	10.9	10.0	7.8	7.9	-8	-22	1	-28
<b>Men</b>								
Earnings (2007 dollars)								
10th percentile	15,000	12,200	15,300	14,600	-19	25	-5	-3
50th percentile	41,000	38,200	42,400	41,000	-7	11	-3	0
90th percentile	75,000	79,500	96,300	100,000	6	21	4	33
Ratios								
50th to 10th percentile	2.7	3.1	2.8	2.8	15	-10	0	4
90th to 50th percentile	1.8	2.1	2.3	2.4	17	10	4	33
90th to 10th percentile	5.0	6.5	6.3	6.9	30	-3	10	38
<b>Women</b>								
Earnings (2007 dollars)								
10th percentile	2,600	4,400	7,100	8,000	69	61	13	208
50th percentile	18,800	22,900	28,200	30,000	22	23	6	60
90th percentile	39,700	49,700	61,500	68,000	25	24	11	71
Ratios								
50th to 10th percentile	7.2	5.3	4.0	3.8	-26	-25	-5	-47
90th to 50th percentile	2.1	2.2	2.2	2.3	5	0	5	10
90th to 10th percentile	15.3	11.4	8.7	8.5	-25	-24	-2	-44

Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Earnings were adjusted for inflation using the price index for personal consumption expenditures and rounded to the nearest \$100.

**Table 2.****Employment Characteristics of Workers at Selected Percentiles of the Earnings Distribution, by Sex**

	1979	1989	2000	2007
<b>Men</b>				
<i>Percentage of Workers Employed Full-Time and for the Full Year</i>				
10th Percentile	40	43	65	60
50th Percentile	87	90	93	92
90th Percentile	94	96	96	96
<i>Average Hours Worked per Year by Full-Time, Full-Year Workers</i>				
10th Percentile	2,270	2,250	2,180	2,170
50th Percentile	2,260	2,290	2,310	2,290
90th Percentile	2,380	2,410	2,460	2,450
<i>Average Hours Worked per Year by Part-Time or Part-Year Workers</i>				
10th Percentile	1,320	1,310	1,380	1,230
50th Percentile	1,620	1,750	1,640	1,670
90th Percentile	1,580	1,910	1,710	1,710
<b>Women</b>				
<i>Percentage of Workers Employed Full-Time and for the Full Year</i>				
10th Percentile	4	6	15	18
50th Percentile	67	76	81	83
90th Percentile	87	89	87	90
<i>Average Hours Worked per Year by Full-Time, Full-Year Workers</i>				
10th Percentile	2,410	2,290	2,100	2,120
50th Percentile	2,080	2,120	2,140	2,140
90th Percentile	2,160	2,230	2,280	2,250
<i>Average Hours Worked per Year by Part-Time or Part-Year Workers</i>				
10th Percentile	480	720	890	1,000
50th Percentile	1,480	1,460	1,380	1,430
90th Percentile	1,650	1,630	1,650	1,540

Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. CBO defined full-time, full-year workers as those who usually work 35 or more hours per week and work 50 or more weeks per year and part-time or part-year workers as those who usually work less than 35 hours per week or work fewer than 50 weeks per year. Estimates for workers at the 10th percentile of the distribution are averages for workers whose earnings put them between the 8th and 12th percentiles of the distribution. Estimates for workers at the 50th and 90th percentiles were similarly calculated.

**Table 3.****Real Annual Earnings of Workers at Selected Percentiles at the Top of the Earnings Distribution, by Sex**

	1989	2000	2005	Percentage Change		
				1989-2000	2000-2005	1989-2005
<b>All Workers</b>						
Earnings (2007 dollars)						
90th percentile <sup>a</sup>	65,100	75,200	78,000	16	4	20
95th percentile	82,200	100,100	103,200	22	3	26
99th percentile	159,800	216,700	214,600	36	-1	34
Ratios						
95th to 90th percentile	1.3	1.3	1.3	0	0	0
99th to 95th percentile	1.9	2.2	2.1	16	-5	11
99th to 90th percentile	2.5	2.9	2.8	16	-3	12
<b>Men</b>						
Earnings (2007 dollars)						
90th percentile <sup>a</sup>	76,900	89,900	91,500	17	2	19
95th percentile	99,400	122,400	123,400	23	1	24
99th percentile	213,700	285,700	278,100	34	-3	30
Ratios						
95th to 90th percentile	1.3	1.4	1.3	8	-7	0
99th to 95th percentile	2.2	2.3	2.3	5	0	5
99th to 90th percentile	2.8	3.2	3.0	14	-6	7
<b>Women</b>						
Earnings (2007 dollars)						
90th percentile <sup>a</sup>	48,000	57,900	62,200	21	7	30
95th percentile	57,900	73,300	79,400	27	8	37
99th percentile	86,800	130,400	139,100	50	7	60
Ratios						
95th to 90th percentile	1.2	1.3	1.3	8	0	8
99th to 95th percentile	1.5	1.8	1.8	20	0	20
99th to 90th percentile	1.8	2.3	2.2	28	-4	22

Source: Congressional Budget Office based on the Social Security Administration's Continuous Work History Sample.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures and rounded to the nearest \$100.

a. Earnings for people at the 90th percentile in the Continuous Work History Sample differ from those in the Census Bureau's Current Population Survey (shown in Table 1 on page 14). See the appendix for a discussion of the differences between the two data sets.

**Table 4.****Earnings Mobility of Men, 2000 to 2005**

(Percent)

Earnings Category in 2000	Earnings Category in 2005							
	Quintile <sup>a</sup>					90th to 94th Percentile	95th to 98th Percentile	99th Percentile and Above
	Lowest	Second	Middle	Fourth	Highest			
Quintile <sup>a</sup>								
Lowest	50	28	12	7	3	1	0	0
Second	18	41	28	9	3	1	0	0
Middle	8	15	42	29	6	1	1	0
Fourth	5	5	13	51	26	4	1	0
Highest	3	2	3	12	80	24	22	6
90th to 94th Percentile	2	2	3	7	86	39	27	2
95th to 98th Percentile	2	2	2	3	91	16	55	13
99th Percentile and Above	2	1	1	2	93	5	27	58

Source: Congressional Budget Office based on the Social Security Administration's Continuous Work History Sample.

Notes: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

To examine mobility, CBO arrayed workers ages 25 to 54 by their earnings in 2000 and separated them into five equally sized segments (or quintiles). It did the same for workers ages 25 to 54 in 2005. Workers who "changed quintiles" were in a different quintile in 2005 than in 2000. Overall, 47 percent of the men in the sample in 2000 were in a different quintile of the earnings distribution in 2005: 30 percent had moved up at least one quintile, and 17 percent had moved down at least one quintile.

- a. The lowest quintile refers to workers whose earnings are at or below the 20th percentile of the distribution, the second quintile to workers with earnings between the 21st and 40th percentiles, and so on.

**Table 5.****Earnings Mobility of Women, 2000 to 2005**

(Percent)

Earnings Category in 2000	Earnings Category in 2005							
	Quintile <sup>a</sup>					90th to 94th Percentile	95th to 98th Percentile	99th Percentile and Above
	Lowest	Second	Middle	Fourth	Highest			
Quintile <sup>a</sup>								
Lowest	46	30	14	7	4	1	0	0
Second	20	40	26	10	4	1	0	0
Middle	9	16	42	26	6	1	1	0
Fourth	5	6	14	49	25	4	2	0
Highest	3	3	4	13	77	22	21	6
90th to 94th Percentile	3	2	3	7	84	38	24	2
95th to 98th Percentile	3	2	2	4	88	16	54	11
99th Percentile and Above	3	2	2	3	91	5	24	58

Source: Congressional Budget Office based on the Social Security Administration's Continuous Work History Sample.

Notes: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

To examine mobility, CBO arrayed workers ages 25 to 54 by their earnings in 2000 and separated them into five equally sized segments (or quintiles). It did the same for workers ages 25 to 54 in 2005. Workers who "changed quintiles" were in a different quintile in 2005 than in 2000. Overall, 49 percent of the women in the sample in 2000 were in a different quintile of the earnings distribution in 2005: 30 percent had moved up at least one quintile, and 19 percent had moved down at least one quintile.

- a. The lowest quintile refers to workers whose earnings are at or below the 20th percentile of the distribution, the second quintile to workers between the 21st and 40th percentiles, and so on.

**Table 6.****Women and Foreign-Born People as Shares of the Workforce**

(Percent)

	1979	1989	1994	2000	2007
Women	44.4	46.6	47.2	47.8	47.2
Foreign-Born People	n.a.	n.a.	10.5	13.9	16.9

Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Notes: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment.

n.a. = not applicable; data on immigration were not collected before 1994.

**Table 7.****Demographic Characteristics of Workers, by Sex**

	1979	1989	2000	2007
<b>Men</b>				
Educational Attainment (Percent)				
Less than high school	19.7	13.5	10.4	11.0
High school	32.7	34.8	31.5	30.7
Greater than high school	47.6	51.6	58.1	58.2
Age	37.4	37.3	39.1	39.4
<b>Women</b>				
Educational Attainment (Percent)				
Less than high school	16.9	10.2	8.2	6.7
High school	42.3	38.8	30.2	26.1
Greater than high school	40.8	51.0	61.6	67.2
Age	37.2	37.4	39.4	39.7

Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment.

**Table 8.****Real Hourly Wages of Workers at Selected Percentiles of the Earnings Distribution, by Sex**

(2007 dollars)	1979	1989	2000	2007
<b>Men</b>				
10th Percentile	10.20	8.80	9.80	9.70
50th Percentile	19.50	17.90	19.30	19.60
90th Percentile	32.20	34.30	42.80	42.40
<b>Women</b>				
10th Percentile	8.80	8.10	10.50	10.80
50th Percentile	10.50	12.50	15.40	15.60
90th Percentile	19.70	24.40	29.50	32.50

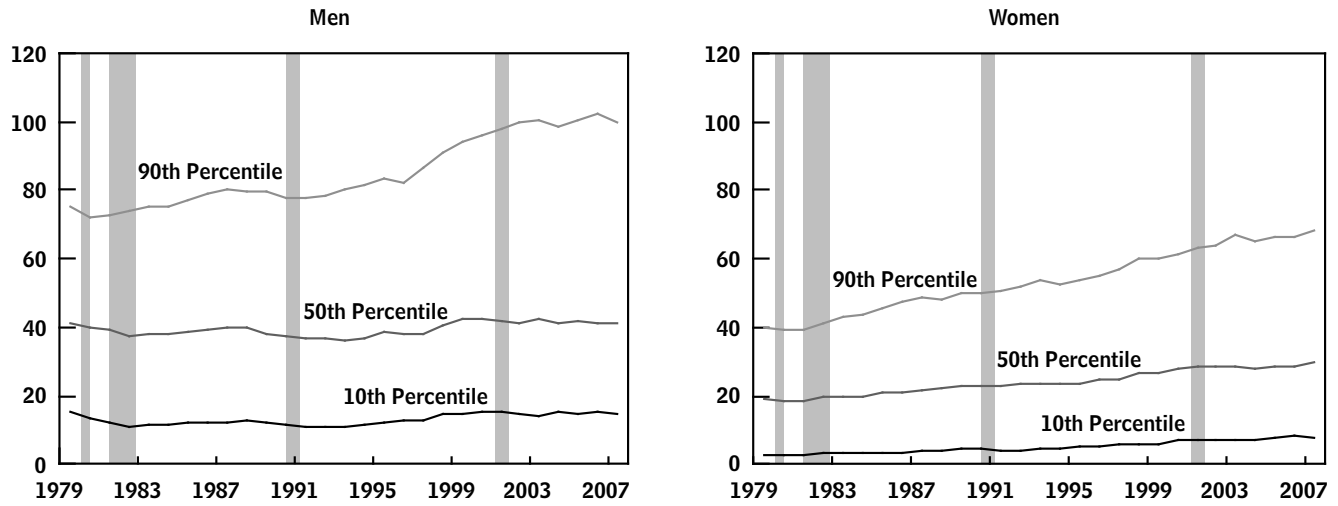
Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Estimates for workers at the 10th percentile of the distribution are averages for workers between the 8th and 12th percentiles of the distribution. Estimates for workers at the 50th and 90th percentiles were similarly calculated. Hourly wages were calculated as annual earnings divided by the multiple of the number of weeks worked during the year and the number of hours usually worked per week. Hourly wages were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 1.**

**Real Annual Earnings of Men and Women at Selected Percentiles of Their Earnings Distributions**

(Thousands of 2007 dollars)



Source: Congressional Budget Office based on the Census Bureau's March Current Population Surveys and information on the timing of recessions from the National Bureau of Economic Research.

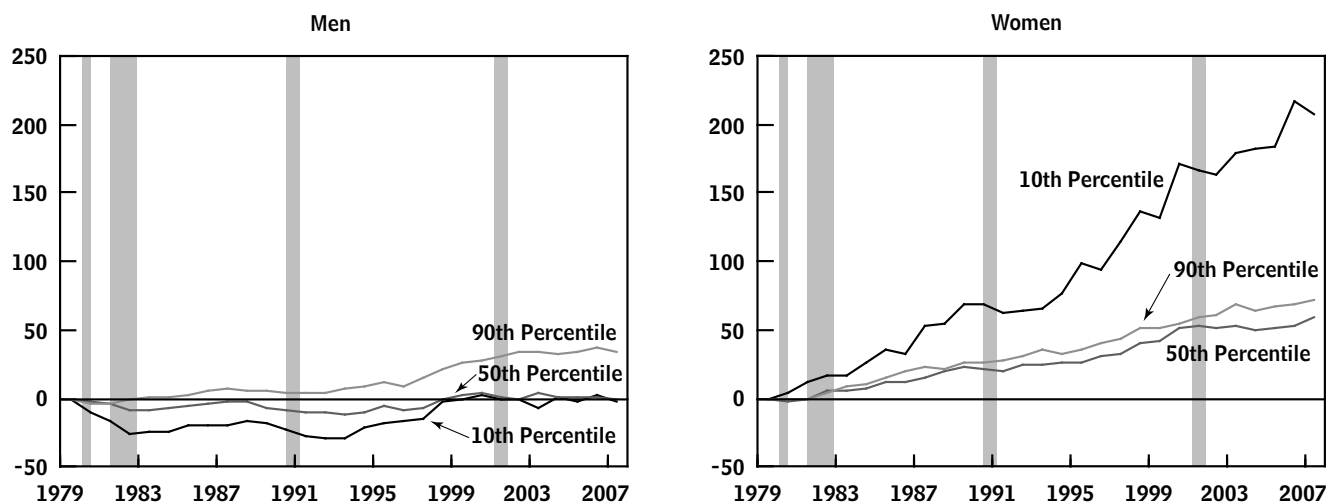
Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Earnings were adjusted for inflation using the price index for personal consumption expenditures.



**Figure 2.**

**Cumulative Change in Real Annual Earnings of Men and Women at Selected Percentiles of Their Earnings Distributions**

(Percent)



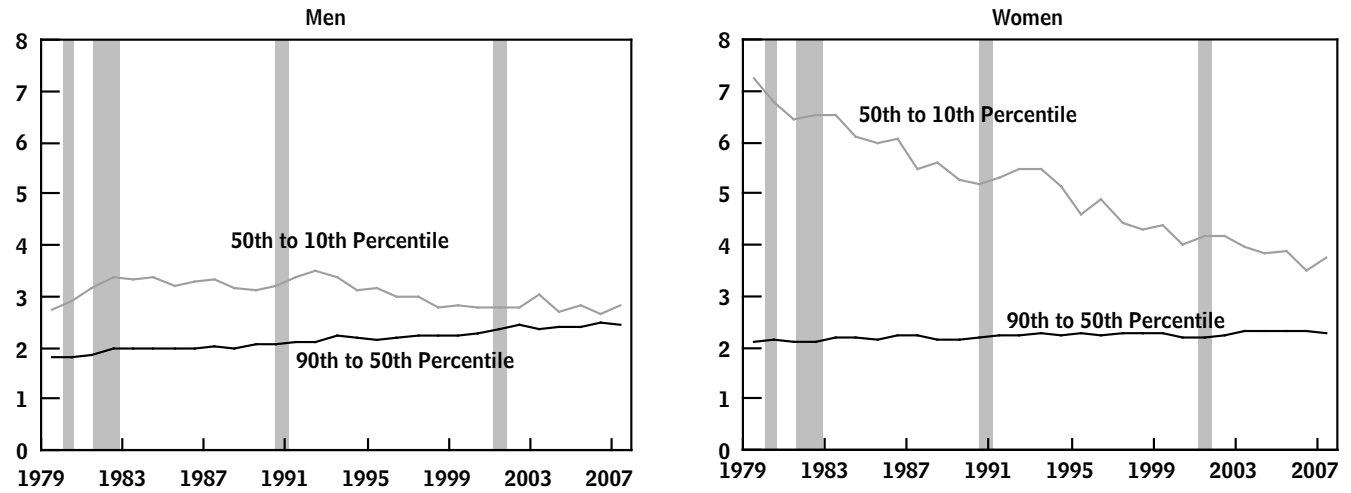
Source: Congressional Budget Office using data on earnings from the Census Bureau's March Current Population Surveys and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 3.**

**Selected Ratios of Real Annual Earnings of Men and Women at Various Percentiles of Their Earnings Distributions**

(Ratio)



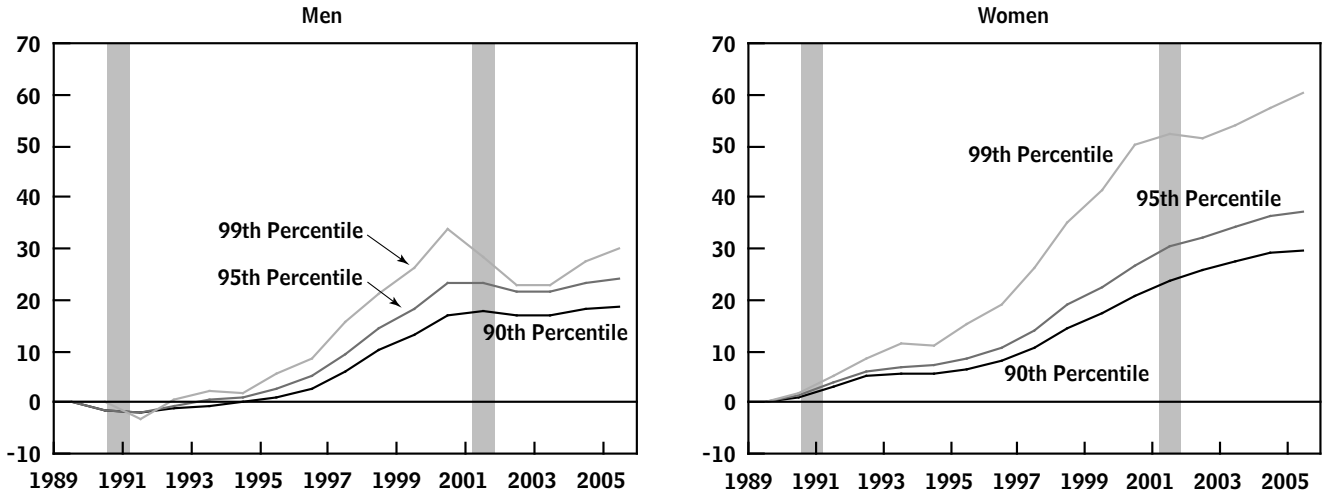
Source: Congressional Budget Office using data on earnings from the Census Bureau's March Current Population Surveys and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 4.**

**Cumulative Change in Real Annual Earnings of Men and Women at Selected Percentiles at the Top of Their Earnings Distributions**

(Percent)



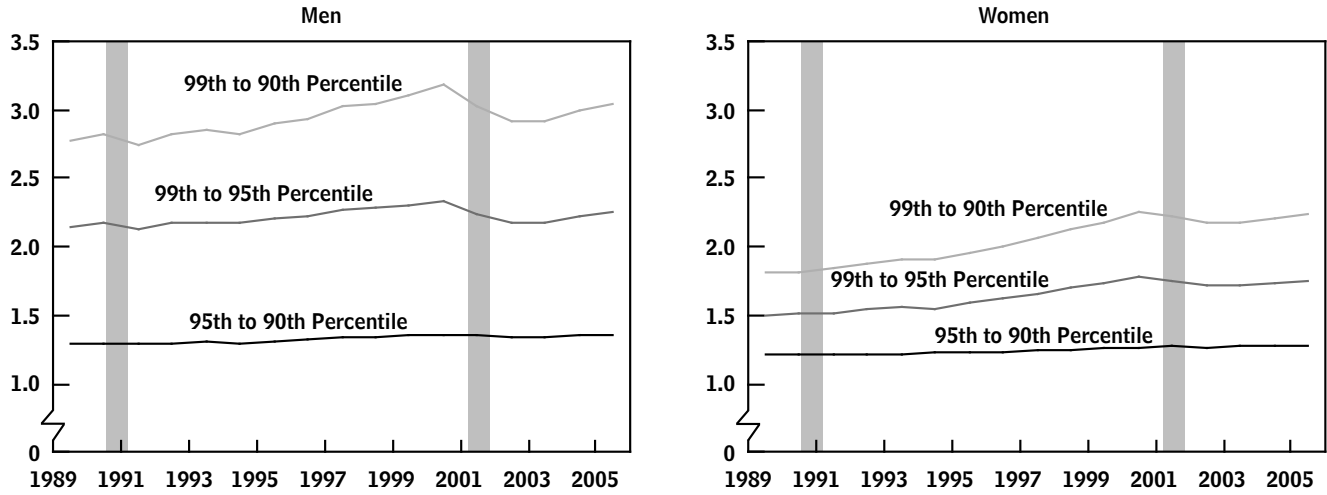
Source: Congressional Budget Office using data on earnings from the Social Security Administration's Continuous Work History Sample and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 5.**

**Selected Ratios of Real Annual Earnings of Men and Women at Various Percentiles at the Top of Their Earnings Distributions**

(Ratio)



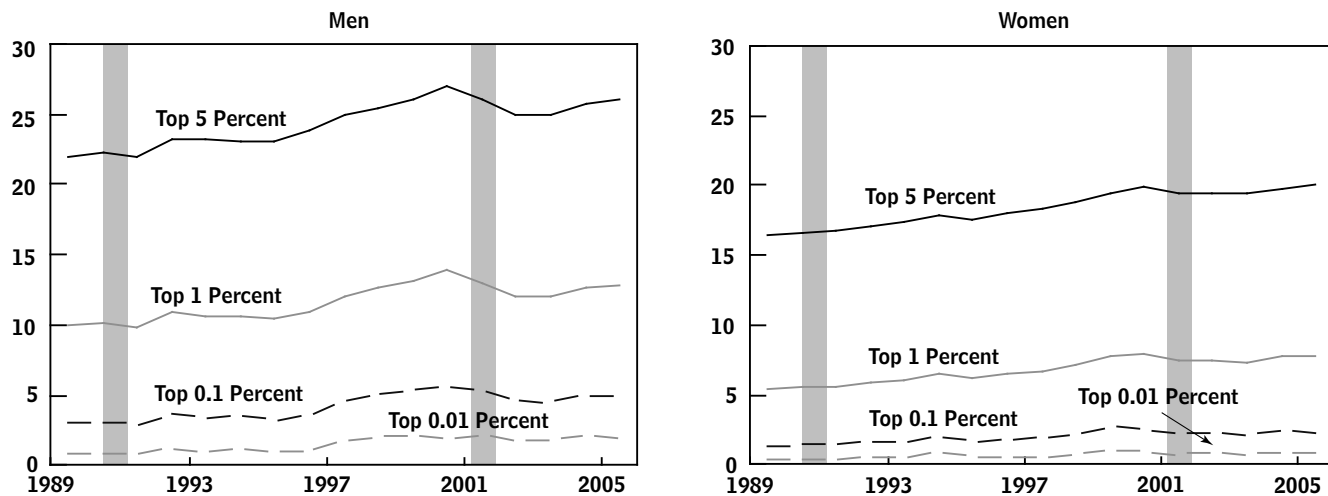
Source: Congressional Budget Office using data on earnings from the Social Security Administration's Continuous Work History Sample and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 6.**

### Shares of Earnings Received by Men and Women in the Top 5 Percent of Their Earnings Distributions

(Percent)



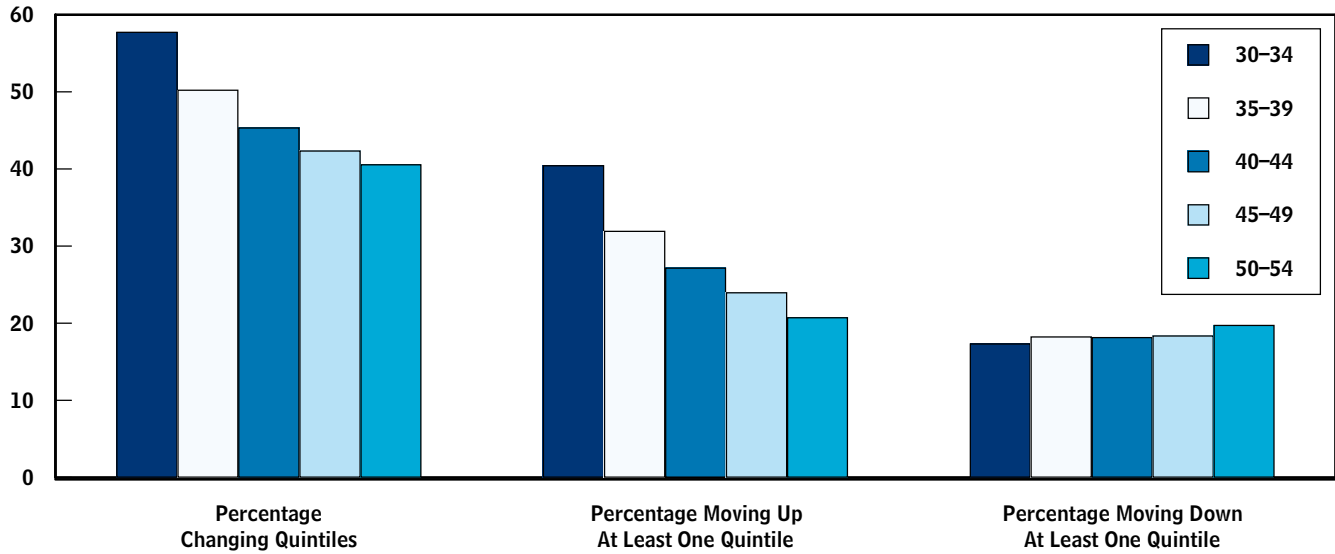
Source: Congressional Budget Office using data on earnings from the Social Security Administration's Continuous Work History Sample and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

**Figure 7.**

**Earnings Mobility of Men and Women Between 2000 and 2005, by Workers' Ages in 2005**

(Percent)



Source: Congressional Budget Office based on the Social Security Administration's Continuous Work History Sample.

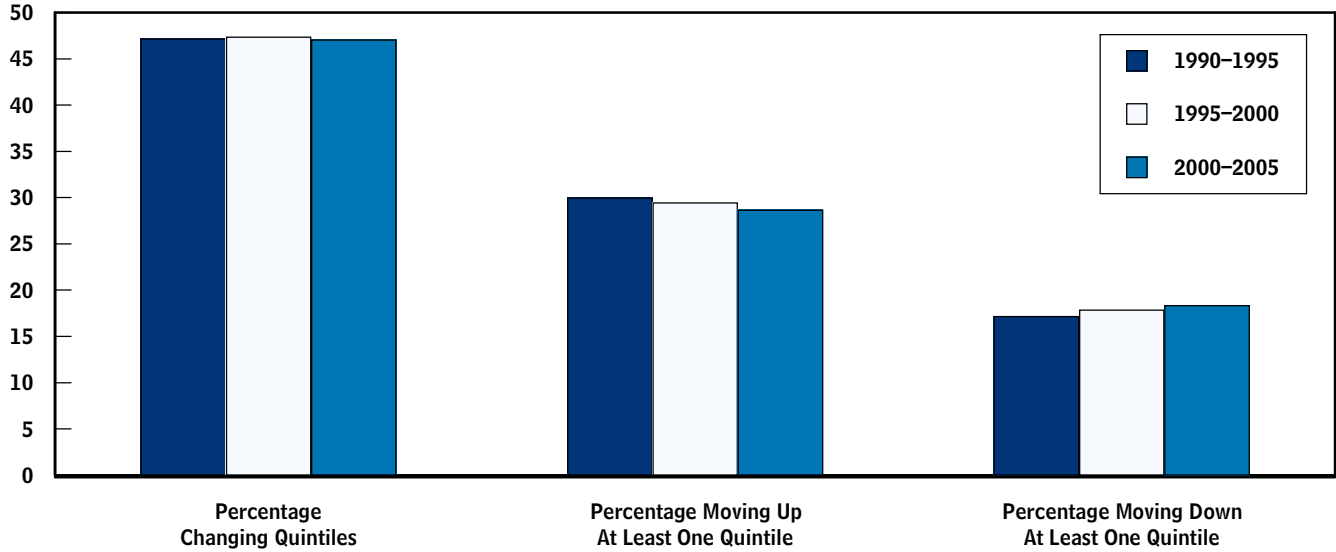
Notes: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

To examine mobility, CBO arrayed workers ages 25 to 54 by their earnings in 2000 and separated them into five equally sized segments (or quintiles). It did the same for workers ages 25 to 54 in 2005. Workers who "changed quintiles" were in a different quintile in 2005 than in 2000.

**Figure 8.**

**Earnings Mobility of Men and Women During Selected Periods**

(Percent)



Source: Congressional Budget Office based on the Social Security Administration's Continuous Work History Sample.

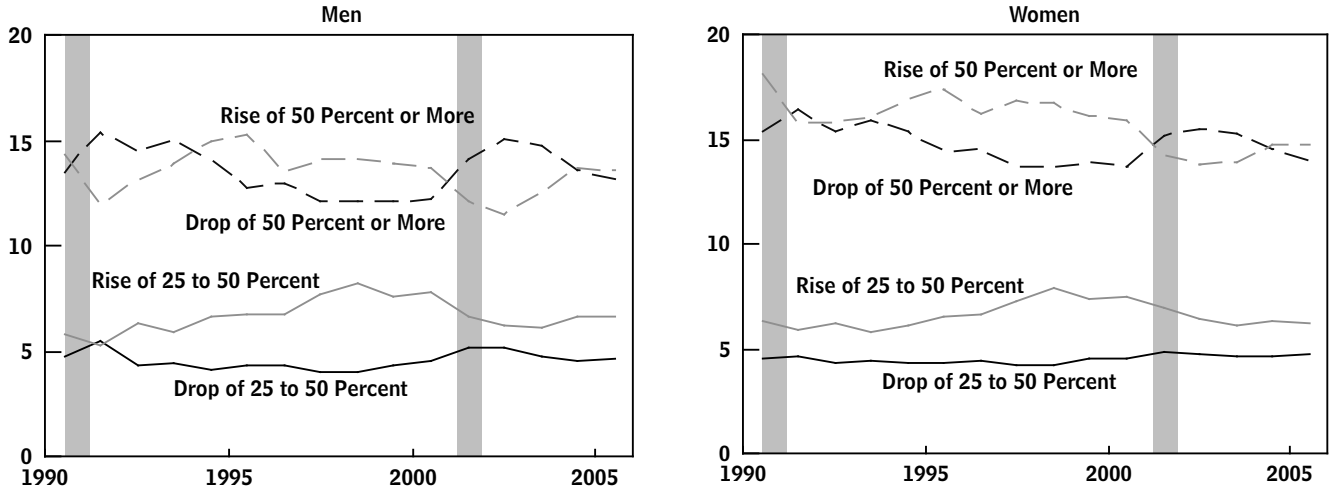
Notes: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.

To examine mobility, CBO arrayed workers ages 25 to 54 by their earnings in the first year of a period and separated them into five equally sized segments (or quintiles). It did the same for workers ages 25 to 54 five years later. Workers who "changed quintiles" were in a different quintile in the later year than in the earlier year.

**Figure 9.**

**Variability in Men's and Women's Real Annual Earnings**

(Percent)



Source: Congressional Budget Office using data on earnings from the Social Security Administration's Continuous Work History Sample and information on the timing of recessions from the National Bureau of Economic Research.

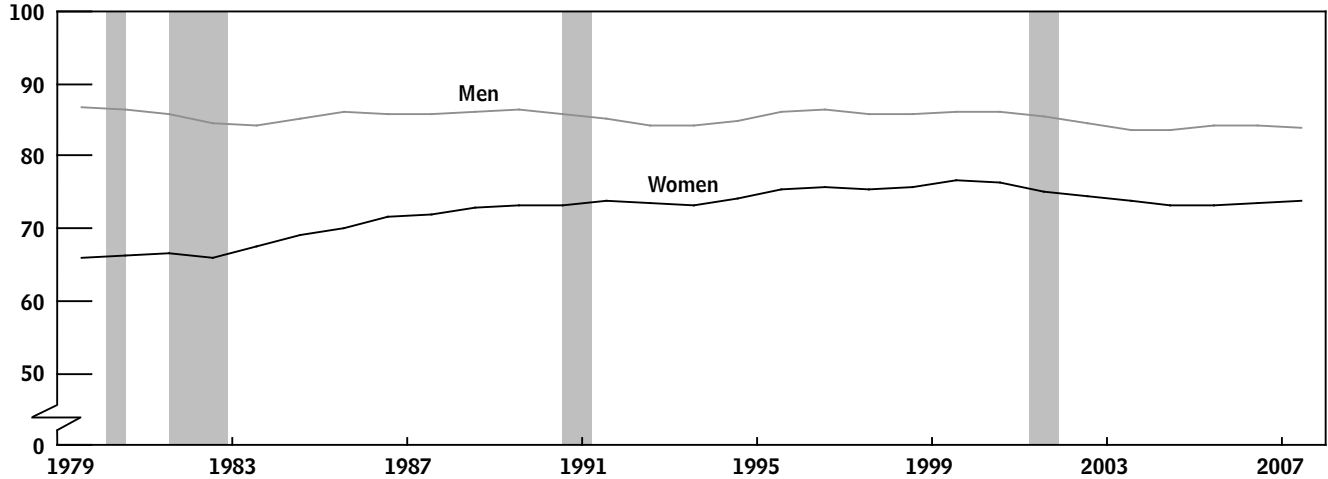
Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures. The percentage change in earnings is defined here as  $((e_t - e_{t-1}) / ((e_t + e_{t-1}) / 2)) * 100$ .



**Figure 10.**

**Percentage of People with Positive Annual Earnings, by Sex**

(Percent)



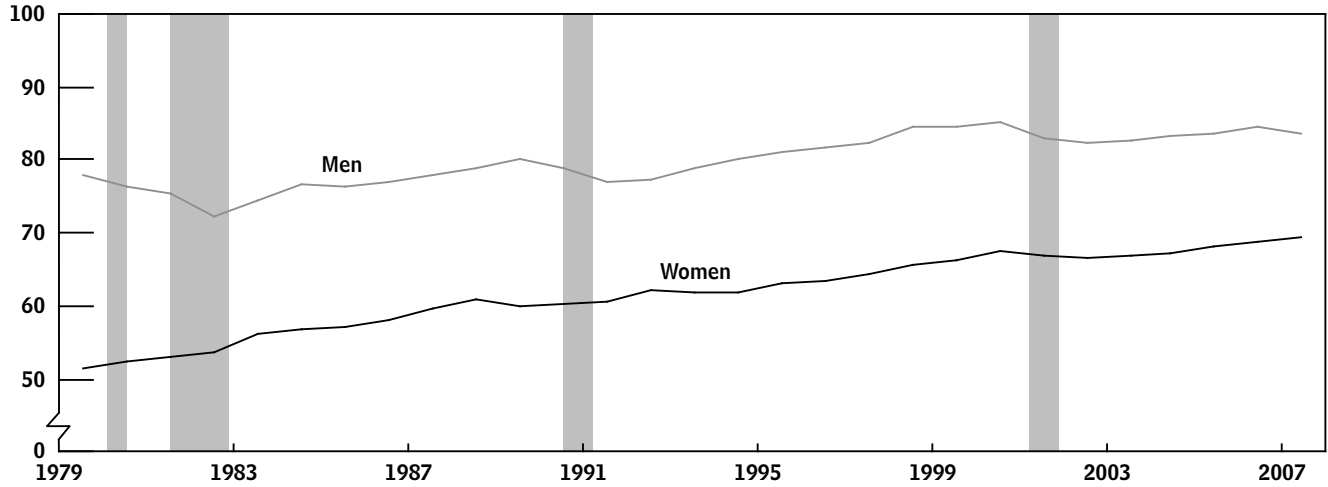
Source: Congressional Budget Office using data on earnings from the Census Bureau's March Current Population Surveys and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment.

**Figure 11.**

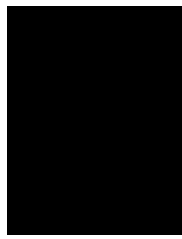
**Percentage of Workers Employed Full-Time and for the Full Year, by Sex**

(Percent)



Source: Congressional Budget Office using data on earnings from the Census Bureau's March Current Population Surveys and information on the timing of recessions from the National Bureau of Economic Research.

Note: The sample that CBO used consisted of people ages 25 to 54 with earnings, which included wages and salaries but excluded income from self-employment. Full-time, full-year workers are defined here as those who usually work 35 or more hours per week and work 50 or more weeks per year.



## Appendix: Data and Methods

**T**o examine earnings between the 10th and 90th percentiles of the earnings distribution, the Congressional Budget Office (CBO) used data from a survey conducted by the Census Bureau, what is now called the Annual Social and Economic Supplement to the Current Population Survey (also known as the March CPS). To examine earnings at the top of the distribution as well as earnings mobility and variability, CBO used data from the Continuous Work History Sample (CWHS) provided by the Social Security Administration (SSA).

CBO's analysis focused on workers ages 25 to 54 during the 1979–2007 period.<sup>1</sup> By restricting the sample to people in that age range, CBO reduced the effect of decisions about education (earlier in life) or retirement (later in life) on its results.

The most recent year for which data were available from the CPS at the time CBO's main analysis was undertaken was 2007; that year also coincided with a “trough” in the unemployment rate—a relatively low 3.7 percent—for people ages 25 to 54. In order to compare similar points in the employment cycle, CBO chose 1979, another trough year, as the initial year of the analysis. In that year, the unemployment rate for that age group was a relatively low 4.2 percent. The two other trough years that fell within the 1979–2007 period were 1989 and 2000, with unemployment rates of 4.2 percent and 3.1 percent, respectively. The part of CBO's analysis that used data

from the CWHS begins in 1989, to coincide with that trough year, and ends in 2005, the most recent year of data available to CBO. In 2005, the unemployment rate of people ages 25 to 54 was 4.1 percent, a rate comparable to that in 1989.

All earnings were indexed to 2007 dollars using the price index for personal consumption expenditures (PCE). Another commonly cited measure of consumer price inflation—the research series of the consumer price index for all urban consumers (CPI-U-RS)—tends to grow slightly faster than the PCE price index. In other words, the CPI-U-RS overstates inflation relative to the PCE price index. That is because the CPI-U-RS does not fully account for the extent to which households maintain a standard of living by substituting one product for another when the price of the first product changes relative to the price of all other products. The PCE price index incorporates adjustments that people make over time in the types of goods and services they buy; in contrast, the CPI-U-RS uses a “basket” of products that is assembled according to patterns of consumption that may be as much as two years old.

To examine earnings variability, CBO constructed a measure showing the percentage change in earnings from one year to the next for each individual. That percentage change (known as the arc percentage change) in earnings  $e$  is defined here for time period  $t$  as  $((e_t - e_{t-1}) / ((e_t + e_{t-1}) / 2)) * 100$ . Defining the percentage change in that way allowed CBO to include individuals who move from zero to positive earnings and those who move from positive to zero earnings symmetrically; that is, for example, a person entering employment has a change in earnings of 200 percent, and a person leaving employment has a

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1. Workers are defined as people who have earnings of more than zero. However, the primary results of this paper are not sensitive to the exclusion of workers with very low annual earnings. For example, the basic conclusions remain unchanged if workers are defined as people who have earnings of more than \$1,000.

change of -200 percent. A more traditional definition of percentage change— $((e_t - e_{t-1})/e_{t-1}) * 100$ —yields undefined results for workers moving from zero to some earnings (that is, workers for whom  $e_{t-1}$  equals zero). Relative to the traditional measure of the percentage change, the arc percentage change used in this analysis understates increases and overstates decreases in earnings.

### The March Current Population Survey

The March CPS contains rich demographic and economic information on a large number of households. The data for the main analysis, which were taken from the March CPS for the years 1980 to 2008, refer to calendar years 1979 to 2007. CBO used person-level sample weights that are available in the CPS. That is, the results were weighted in such a way that the sample was nationally representative. The measure of earnings that CBO used in its analysis—annual wages and salaries—does not include income from self-employment.

### Benefits and Limitations of the March Current Population Survey

A primary benefit of the CPS is that it includes information on the workers it covers (such as their education, the number of weeks they worked, and the number of hours they usually work per week) that goes beyond their earnings. However, survey data are also subject to certain limitations. For instance, some people contacted for the survey will opt not to respond. Others may have difficulty in recalling information, and some may report rounded rather than exact earnings. If a respondent cannot remember or refuses to give his or her earnings, that response may be imputed, or “filled in,” by the Census Bureau. Over time, increased rates of imputation and proxy responses (where another person in the household answers for the respondent) might bias the survey’s results.<sup>2</sup> And between the 1980 and 2008 surveys, the CPS itself underwent changes in the methods used to collect data, and those changes may affect comparisons over

time. For instance, before 1994, the survey was administered on paper; now, the Census Bureau uses computerized survey instruments.<sup>3</sup>

Finally, earnings in the CPS are “top-coded.” That means that the files provided for public use do not report earnings above a certain threshold in order to protect the confidentiality of the respondents. The top-coding in the CPS data was the primary reason that CBO used the CWHS to examine the earnings of workers in the top 10 percent of the distribution.

### The Continuous Work History Sample

To examine earnings at the top of the distribution and to document earnings mobility and variability, CBO used data from the CWHS provided by the Social Security Administration. CBO also uses the CWHS for its baseline projections of revenues and outlays related to the Social Security and Medicare programs. An understanding of the trends in the distribution of earnings is an important component of such projections because the programs’ revenues and outlays are directly tied to individual workers’ earnings through payroll tax and benefit formulas.

The CWHS data set contains longitudinal administrative earnings records for a 1 percent random sample of Social Security numbers. Each year of data between 1989 and 2005 covers more than 800,000 people ages 25 to 54 who have earnings, and recent years contain about 1 million such people. Thus, in the CWHS data set, the top 1 percent of the distribution (above the 99th percentile) includes at least 8,000 workers for any given year. Person-years in which a worker had more than \$100 million in earnings (a very small number of observations) were dropped from the sample.

Earnings, as defined in this part of CBO’s analysis, include wage and salary earnings, tips, and some other forms of compensation. They exclude self-employment income and deferred compensation, such as contributions to 401(k) accounts.

2. See Marc I. Roemer, *Assessing the Quality of the March Current Population Survey and the Survey of Income and Program Participation Income Estimates, 1990–1996* (Bureau of the Census, Housing and Household Economic Statistics Division, Income Surveys Branch, June 16, 2000), [www.census.gov/hhes/www/income/assess1.pdf](http://www.census.gov/hhes/www/income/assess1.pdf).

3. Details about those changes may be found in Bureau of the Census, *Current Population Survey, March 1995: Technical Documentation* (October 1995).

## Benefits and Limitations of Administrative Earnings Data

Using administrative data in an analysis has both benefits and limitations. Among the benefits is that the data used here are not subject to top-coding; that is, information on the very highest earners is retained. Administrative records also provide a consistent measure of earnings for individuals over many years. In addition, the samples are quite large. Furthermore, administrative data are based on employers' reports of individual earnings and therefore are not subject to survey respondents' errors in recall or to issues of rounding or nonresponse.

Although data on earnings in administrative records are generally presumed to be of higher quality than self-reports of earnings in surveys, administrative data do not reflect all types of earnings.<sup>4</sup> Because administrative records are based on earnings as reported by employers for a random sample of Social Security numbers, they miss cash-based employment (or earnings received in the so-called underground economy) as well as the earnings of workers who do not have or do not report a valid Social Security number. The underground economy can include a variety of illegal activities (such as theft) and may also include legal activities by illegal immigrants or compensation paid "under the table." Mark Ledbetter estimates that total wages and salaries paid in the underground economy amount to about 2 percent of the nation's total earnings.<sup>5</sup> Whether the amount of or variability in those earnings has changed significantly over

time is unclear. Earnings in the underground economy, which are not reflected in administrative data, may not be captured well in survey data either.

The CWHS data used here capture earnings only from workers in the covered sector—that is, workers who are actively contributing to Social Security. In 1990, 95 percent of paid civilian workers were in the covered sector; in 2002, that share was 96 percent. The majority of uncovered earnings come from state, local, or federal government workers.<sup>6</sup> Including that relatively small sector in the analysis is not likely to have a significant effect on its results.

Another limitation of the administrative data is that they contain almost no information on demographic or household characteristics. Some demographic information, such as year of birth and sex, is available; no information is available on family or household linkages, nonlabor income, or assets.

## Comparing the March Current Population Survey and the Continuous Work History Sample

Between 1989 and 2005, the earnings recorded in the CWHS for men and women ages 25 to 54 at the 10th, 50th, and 90th percentiles of their earnings distributions were generally lower than those reported in the CPS, but the trends during those years are similar (see Figure A-1).<sup>7</sup> More investigation is needed to determine why the earnings recorded in the CWHS for that period were lower than those reported in the CPS. One possibility is that individuals with very low annual earnings tended to report that they had no earnings when responding to the CPS, in which case they would be excluded from that sample but would be found in the CWHS.

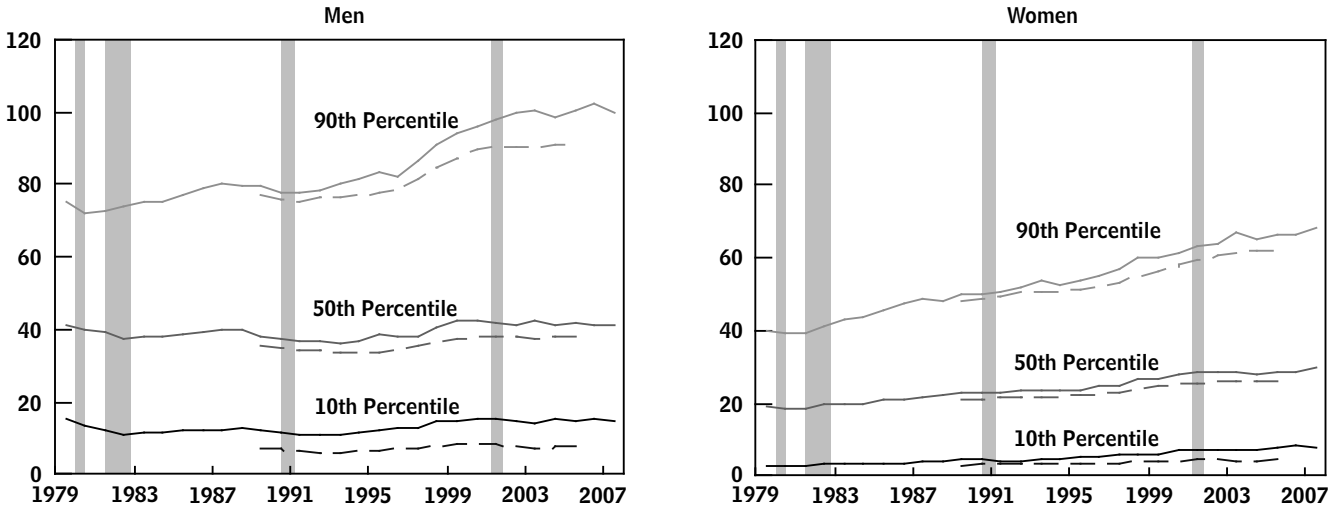
4. For discussions of the validity of survey reports of earnings compared with that of administrative records of earnings, see John M. Abowd and Martha H. Stinson, "Estimating Measurement Error in SIPP Annual Job Earnings: A Comparison of Census Survey and SSA Administrative Data" (draft, January 2005), <http://courses.cit.cornell.edu/jma7/abowd-stinson-200501.pdf>; John Bound and Alan B. Krueger, "The Extent of Measurement Error in Longitudinal Earnings Data: Do Two Wrongs Make a Right?" *Journal of Labor Economics*, vol. 9, no. 1 (January 1991), pp. 1–24; and Julian Cristia and Jonathan A. Schwabish, *Measurement Error in the SIPP: Evidence from Matched Administrative Records*, Congressional Budget Office Working Paper 2007-03 (January 2007).
5. See Table 1 in Mark A. Ledbetter, "Comparison of BEA Estimates of Personal Income and IRS Estimates of Adjusted Gross Income: New Estimates for 2004 and Revised Estimates for 2003," *Survey of Current Business*, vol. 86, no. 11 (Bureau of Economic Analysis, November 2006), pp. 29–36.

6. House Committee on Ways and Means, *2004 Green Book: Background Material and Data on the Programs Within the Jurisdiction of the Committee on Ways and Means*, WMCP:108-6 (March 2004), Table 1-7 and p. 1-4.
7. For a comparison of earnings at the top of the distribution in the CPS and the CWHS, see Jonathan A. Schwabish, *Earnings Inequality and High Earners: Changes During and After the Stock Market Boom of the 1990s*, Congressional Budget Office Working Paper 2006-06 (April 2006).

**Figure A-1.**

**Comparing the Real Annual Earnings of Men and Women at Selected Percentiles of Their Earnings Distributions Using Data from the CPS and the CWHS**

(Thousands of 2007 dollars)



Source: Congressional Budget Office using data on earnings from the Census Bureau's March Current Population Surveys and the Social Security Administration's Continuous Work History Sample, together with information on the timing of recessions from the National Bureau of Economic Research.

Notes: Data from the Current Population Survey (CPS) are shown above as solid lines, and data from the Continuous Work History Sample (CWHS) are shown as dashed lines.

The sample that CBO used consisted of people ages 25 to 54 with earnings. Earnings from the CPS included wages and salaries but excluded income from self-employment. Earnings from the CWHS included wages and salaries, tips, and other forms of compensation but excluded self-employment income and deferred compensation. Earnings were adjusted for inflation using the price index for personal consumption expenditures.