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## **Employment from the BLS household and payroll surveys: summary of recent trends**

### **Overview**

The Bureau of Labor Statistics (BLS) has two monthly surveys that measure employment levels and trends: the Current Population Survey (CPS), also known as the household survey, and the Current Employment Statistics (CES) survey, also known as the payroll or establishment survey.

Estimates from both surveys are published in the “Employment Situation” news release each month. The household and payroll surveys use different definitions of employment and distinct survey and estimation methods. To help data users better understand the differences in the surveys’ employment measures and divergences that sometimes occur in their trends, the following information is provided.

- ♣ Summary comparison of household and payroll survey concepts, definitions, and methodologies
- ♣ Employment trends as measured by the payroll and household surveys
- ♣ Possible causes of differences in employment trends
- ♣ Summary of recent changes made to each survey:
  - Population control adjustments to the household survey
  - Benchmark revisions to the payroll survey

## Summary comparison of household and payroll survey concepts, definitions, and methodologies

Major features and distinctions of the two surveys are compared below in Box 1.

### Box 1. How the household and payroll surveys compare

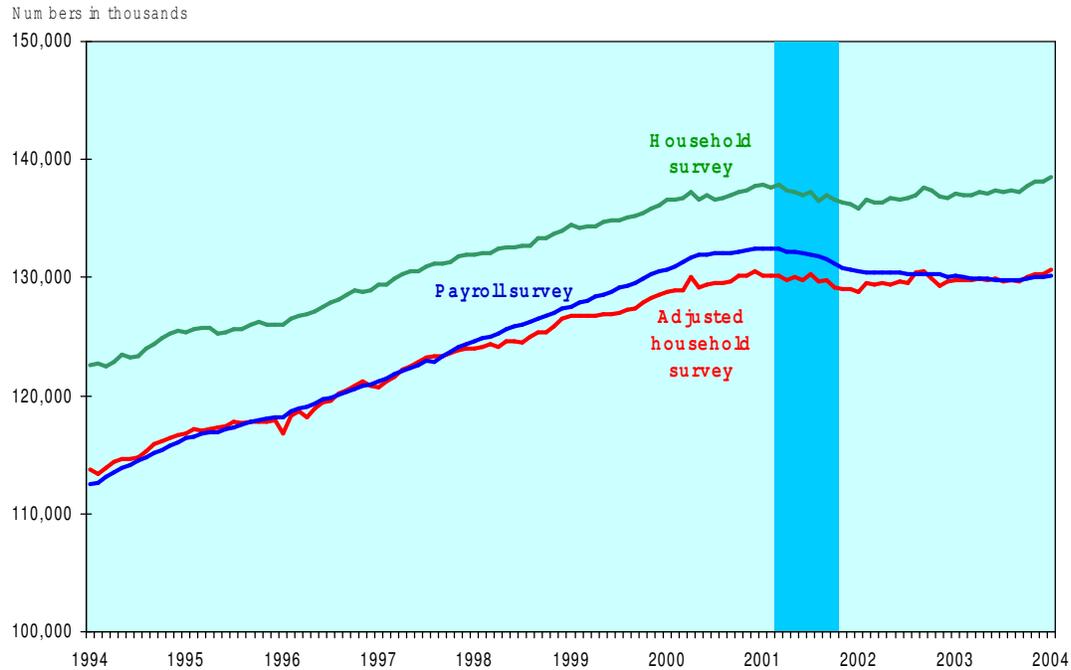
	<b>Household Survey (CPS)</b>	<b>Payroll Survey (CES)</b>
Universe	Civilian noninstitutional population age 16 and over	Nonfarm wage and salary jobs
Type of survey	Monthly sample survey of approximately 60,000 households	Monthly sample survey of about 160,000 businesses and government agencies covering approximately 400,000 establishments
Major outputs	Labor force, employment, unemployment, and associated rates with significant demographic detail	Employment, hours, and earnings with significant industry and geographic detail
Reference period	Calendar week that includes the 12 <sup>th</sup> of the month	Employer pay period that includes the 12 <sup>th</sup> of the month (could be weekly, biweekly, monthly or other)
Employment concept	Estimate of employed persons (multiple jobholders are counted only once)	Estimate of jobs (multiple jobholders counted for each nonfarm payroll job)
Employment definition differences	Includes the unincorporated self employed, unpaid family workers, agriculture and related workers, private household workers, and workers absent without pay	Excludes all of the groups listed at left, except for the logging component of agriculture and related industries
Size of over-the-month change in employment required for a statistically significant movement	±290,000	±108,000
Benchmark adjustments to survey results	No direct benchmark for employment. Adjustments to underlying population base revised annually to intercensal estimates, and every 10 years to the decennial census	Employment benchmarked annually to employment counts derived primarily from Unemployment Insurance (UI) tax records

## **Employment trends as measured by the household and payroll surveys**

**Chart 1** shows employment from the household and payroll surveys from January 1994 through January 2004. Two variations of household survey employment used in BLS research are presented (these variations differ from the official series that appears in the “Employment Situation” and in Labstat). The green household survey line represents a version of total household survey employment where the effects of sizeable population control revisions in January 2000, 2003, and 2004 have been smoothed. The red “adjusted” household survey line represents the smoothed household survey employment series that has been further modified to make it more similar in concept and definition to payroll survey employment. This adjustment to household survey employment subtracts from total employment agriculture and related employment, nonagricultural self employed, unpaid family and private household workers, and workers absent without pay from their jobs, and then adds nonagricultural wage and salary multiple jobholders.

Chart 1 shows that, because of its broader employment definition, the household survey employment level (green line) normally exceeds that of the payroll survey. When the household survey is adjusted to more closely match the payroll survey definition (red line), trend discrepancies between the two surveys are more discernible. In particular, there is an obvious multi-year period from the late 1990s until the onset of the recent recession when payroll employment was growing significantly faster than household survey employment. More recently, the two series converged.

Chart 1. Household and payroll survey employment, seasonally adjusted, 1994-2004



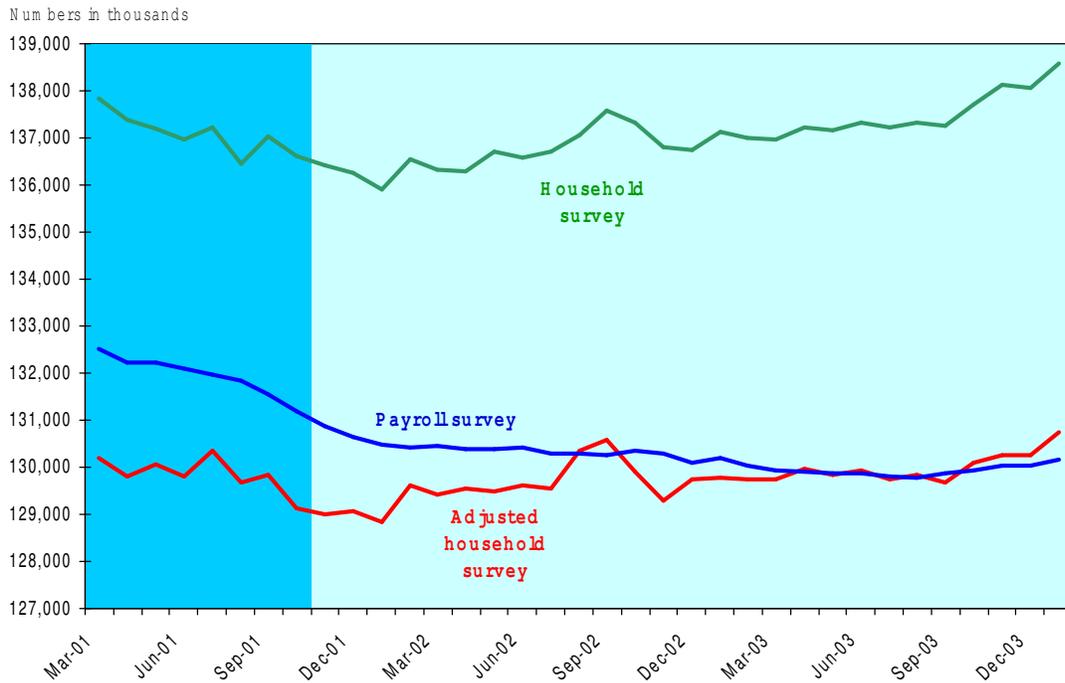
NOTE: The household series presented here has been smoothed for population control revisions. The "adjusted" household series has been smoothed for population control revisions and adjusted to an employment concept more similar to the payroll survey. Shaded area indicates recession.

SOURCE: Bureau of Labor Statistics, February 6, 2004.

**Chart 2** shows the same payroll and household employment series as chart 1, but highlights only the recent recession and post-recessionary period from March 2001 through January 2004. The National Bureau of Economic Research (NBER) designated March 2001 as the most recent business cycle peak and November 2001 as the most recent trough. (The NBER is a private, nonprofit, nonpartisan research organization.)

From Chart 2, the more recent convergence of employment from the two surveys can be seen. Payroll employment declined for a number of the months following the end of the recession, while household survey employment trended up. Since last fall, employment as measured by both surveys has increased, but household survey employment growth has been stronger.

Chart 2. Household and payroll survey employment, seasonally adjusted, March 2001-January 2004



NOTE: The household series presented here has been smoothed for population control revisions. The "adjusted" household series has been smoothed for population control revisions and adjusted to an employment concept more similar to the payroll survey. Shaded area indicates recession.

SOURCE: Bureau of Labor Statistics, February 6, 2004.

**Box 2** shows the change in employment levels from the payroll and household surveys as measured across the following time periods: 1) over the most recent month, 2) over the most recent year, 3) since March 2001, the most recent business cycle peak, and 4) since November 2001, the most recent business cycle trough. The peak and trough dates are determined by the National Bureau of Economic Research (NBER).

**Box 2. Recent trends in payroll and household survey employment**

Numbers in thousands

	Over-the-month change: December 2003- January 2004	Over-the-year change: January 2003- January 2004	From March 2001 (peak) - January 2004	From November 2001 (trough) - January 2004
Payroll survey: total nonfarm employment, seasonally adjusted <sup>1</sup>	112	-35	-2,352	-716
Household survey: total employment, smoothed for population control revisions and seasonally adjusted	496	1,432	714	2,160
Difference	384	1,467	3,066	2,876

<sup>1</sup> Payroll employment for January 2004 is preliminary and subject to revision.

**NOTE:** The household survey figures in Box 2 are calculated from a variation of household survey employment used in BLS research (also shown in Charts 1 and 2). This version of household survey employment smoothes out the effects of sizeable population control revisions to the survey in January 2003 and January 2004.

**Box 3** shows employment trends in the payroll and household surveys over the same periods as in Box 2, but this illustration uses adjusted household employment that is more comparable to the payroll survey (also shown in Charts 1 and 2). Even with this adjustment, the difference in employment change between the two surveys is still substantial.

**Box 3. Recent trends in payroll employment and household survey employment adjusted to an employment concept more similar to that of the payroll survey**

Numbers in thousands

	Over-the-month change: December 2003- January 2004	Over-the-year change: January 2003- January 2004	From March 2001 (peak) - January 2004	From November 2001 (trough) – January 2004
Payroll survey: total nonfarm employment, seasonally adjusted <sup>1</sup>	112	-35	-2,352	-716
Household survey: total employment, smoothed for population control revisions, adjusted to be more like the payroll survey, and seasonally adjusted	474	959	540	1,711
Difference	362	994	2,892	2,427

<sup>1</sup> Payroll employment for January 2004 is preliminary and subject to revision.

**NOTE:** The household survey figures in Box 3 are calculated from a variation of household employment used in BLS research (also shown in Charts 1 and 2). This version of household employment smoothes out the effects of sizeable population control revisions to the survey in January 2003 and January 2004. In addition, it adjusts household survey employment to make it more similar in concept and definition to payroll employment. This adjustment to household survey employment subtracts from total employment agriculture and related employment, nonagricultural self employed, unpaid family and private household workers, and workers on unpaid leave from their jobs, and then adds nonagricultural wage and salary multiple jobholders.

## Possible causes of differences in employment trends

The following summarizes some issues with the surveys that are important when comparing changes in employment from the two sources.

**Sampling error** – The payroll survey has a much larger sample size than the household survey. The payroll survey's active sample covers approximately 400,000 business establishments *of all sizes* representing about one-third of total nonfarm employment. The household survey is much smaller at 60,000 households, covering a very small fraction of total employed persons. Household survey employment is therefore subject to larger sampling error, more than double that of the payroll survey on a monthly basis (see Box 1). When looking at short-term trends in either survey, especially over-the-month changes, it is essential to assess the statistical significance of the change. When comparing the two series over longer periods of time, however, other factors also need to be considered; some of these are discussed below.

**Payroll survey benchmark** – The payroll survey estimates are benchmarked once a year against a full universe count of employment derived from Unemployment Insurance tax records that nearly all employers are required to file. The payroll survey's most recent benchmark—to March 2003 employment records—resulted in a small downward revision of one-tenth of one percent, indicating that the survey estimates were accurately tracking the universe of nonfarm payroll employment (see additional information on the payroll survey benchmark below). The household survey does not have a benchmark source for employment.

**New business births in the payroll survey** – The payroll survey sample does not include new firms immediately. They are incorporated with a lag. In the interim, a model-based estimate is used each month to account for employment resulting from new firm births. Based on the relatively small benchmark revision for March 2003, as well as comparisons to universe data for Second Quarter 2003, the model appears to be performing well during the recent period.

**Population controls in the household survey** – Population controls determine the weights used in the household survey to adjust the sample results to the overall level of the U.S. population. The population controls are developed by the U.S. Census Bureau. They are derived from decennial census information and, between census years, from administrative and other data. There are limitations to the population control estimates due primarily to the difficulties associated with estimating the net international migration component. The population controls contributed significantly to the discrepancy between payroll and household survey employment in the 1980s and 1990s when the household survey showed less growth than the payroll survey.

The upward trend in household employment since the end of the 2001 recession has been largely a function of the estimated growth in population. That is to say, the household survey has not shown an increase in the proportion of the population that is employed. In fact, the employment-population ratio has declined since 2001: it was 64.3 percent at the start of the recession (March 2001) and 63.0 percent at the trough. The ratio declined further from late 2002 to 2003 and has been fairly flat over the past year (62.4 percent in January 2004). The increase in the household survey employment level, therefore, has been driven by the estimated growth in the population. (See additional information on the recent household survey population control adjustments below.)

**Worker classification in the household survey** – As was illustrated in Box 3 above, adjusting for the measurable differences in the surveys’ employment definitions resolves only a portion of the discrepancy. This adjustment process is imperfect, however, because precise data are not available in many cases to make the best possible adjustment. For example, some independent contractors are not reported as self employed in the household survey, but rather as wage and salary workers. This type of reporting issue limits BLS’ ability to fully reconcile the two employment measures.

**“Off-the-books” employment** – Workers who are paid “off -the-books” are not reported in the payroll survey. The household survey could possibly include some of these workers, but BLS cannot determine the extent to which they might be reflected in household survey employment.

### Summary

- BLS has estimated the measurable definitional differences between the household and payroll surveys and found they provide a partial explanation for the employment trend differences. There are a number of definitional differences between the surveys that cannot be readily measured or quantified. These differences may contribute to divergences in the surveys’ trends, but their effects are either unknown or can only be conjectured. In addition, although BLS has devoted considerable attention to this issue, there may be other contributing factors that have not been identified.
- A summary of some of BLS’ research was presented to the Federal Economic Statistics Advisory Committee (FESAC) in October 2003. The paper is available on the BLS Internet site at <http://www.bls.gov/bls/fesacp2101703.pdf>.
- BLS is continuing to investigate possible causes of recent divergences in employment growth between the payroll and household surveys. BLS also has implemented improvements that addressed past limitations. The redesign of the payroll survey, for example, led to the use of a probability sample, more frequent updating of the survey sample frame, and the development of a more effective means to estimate business births and deaths. With regard to the household survey population controls, the Census Bureau remains engaged in efforts to improve the intercensal population estimates. In particular, they have begun utilizing information from the large American Community Survey (ACS) to improve the estimates of net international migration.
- Despite the divergence in their trends, both the payroll and household surveys add to our information about the labor market. Nonfarm wage and salary employment as measured by the payroll survey declined since the recession; more recently, it has been trending up. The household survey covers a broader scope of employment. From the household survey, we know that the number of self employed has grown and, to the extent that independent contractors may be under-reported in this category, the self employed may be a larger factor in household employment growth than recognized. The household survey also tells us that even though the number of employed persons has increased since the recession, a smaller proportion of the population is working.

## Population control adjustments to the household survey

**January 2004 adjustment** – As part of its annual review of intercensal population estimates, the U.S. Census Bureau determined that a *downward* adjustment should be made to the household survey population controls. This adjustment stems from revised estimates of net international migration for 2000 through 2003. In keeping with usual practice, the new controls were used in the survey starting with data for January 2004. Estimates for December 2003 and earlier months were *not* revised to reflect the new (lower) population controls.

A comparison of December 2003 data based on the old and new controls indicated that the population decrease caused declines in the labor force (-437,000), employment (-409,000), and unemployment (-27,000). The total unemployment rate, labor force participation rate, and employment-population ratio, however, were not affected. Additional details on the January 2004 population adjustments are provided in the table below.

### January 2004 household survey population control adjustment effect

<b>Employment status of the population, December 2003</b>			
(Numbers in thousands)			
	December 2003 as published	December 2003 based on adjusted population controls	Difference <sup>1</sup>
Civilian noninstitutional population	222,509	221,949	-560
Civilian labor force	146,501	146,065	-437
Participation rate	65.8	65.8	0.0
Employed	138,556	138,147	-409
Employment-population ratio	62.3	62.2	0.0
Unemployed	7,945	7,918	-27
Unemployment rate	5.4	5.4	0.0
Not in labor force	76,007	75,884	-123

<sup>1</sup> Differences are calculated from unrounded estimates.

**Previous population control adjustments** – This latest population control adjustment follows two previous *increases* in the controls. With the release of January 2003 household data last year, BLS introduced two separate adjustments that increased the survey population controls.

- 1) Beginning in January 2000, household estimates reflect an increase in population resulting from the switch to the Census 2000 population controls.
- 2) In January 2003, household estimates reflect new, higher population controls. The upward adjustment resulted from higher estimates of net international migration in the population for 2000 through 2002.

Both of these adjustments in population controls resulted in an increase in the employment estimates from the household survey. The impact on employment of the January 2000 adjustment was about 1.6 million. The impact of the January 2003 adjustment was about 576,000.

**Interpreting household data with the population control adjustments** – The level shifts in household survey employment resulting from these population adjustments make it difficult for data users to compare changes in employment over time periods that include the “bumps.” As a convenience to its data users, BLS created a research series that smoothes the level shifts in employment resulting from the January 2000, 2003, and 2004 population control adjustments. This household employment research series was used in Charts 1 and 2 and Box 2 above to provide a clearer picture for analysis. The full series, 1990-2003, is shown in the table below.

**Household Survey Employment Smoothed for Population Controls, Seasonally Adjusted, January 1990-December 2003**

(In thousands)

	January	February	March	April	May	June	July	August	September	October	November	December
1990	119,093	119,082	119,238	118,898	119,209	119,052	118,891	118,894	118,628	118,651	118,432	118,379
1991	118,089	117,915	117,823	118,293	117,634	117,845	117,785	117,712	118,169	118,052	118,033	117,740
1992	118,265	118,050	118,454	118,748	118,709	118,764	119,071	119,195	119,101	119,020	119,280	119,413
1993	119,503	119,715	119,995	119,938	120,594	120,781	120,970	121,373	121,081	121,363	121,722	122,031
1994	122,547	122,679	122,534	122,908	123,497	123,277	123,362	124,013	124,372	124,811	125,230	125,448
1995	125,402	125,681	125,720	125,722	125,207	125,321	125,629	125,677	125,972	126,241	126,052	125,963
1996	126,013	126,542	126,779	126,924	127,189	127,562	127,922	128,161	128,540	128,909	128,801	128,904
1997	129,358	129,370	129,981	130,247	130,584	130,544	130,970	131,172	131,194	131,368	131,859	131,898
1998	131,958	132,053	132,072	132,484	132,614	132,545	132,643	132,718	133,333	133,359	133,655	133,994
1999	134,436	134,276	134,381	134,402	134,775	134,855	134,905	135,097	135,227	135,529	135,862	136,092
2000	136,569	136,614	136,691	137,294	136,649	136,968	136,569	136,761	136,976	137,200	137,399	137,723
2001	137,889	137,687	137,852	137,396	137,191	136,978	137,234	136,464	137,027	136,612	136,406	136,258
2002	135,902	136,557	136,308	136,305	136,723	136,578	136,710	137,051	137,586	137,335	136,807	136,729
2003	137,134	136,997	136,971	137,240	137,158	137,317	137,240	137,320	137,263	137,704	138,133	138,070

NOTE: This series reflects seasonally adjusted household survey employment that has been revised from January 1990-December 2003 to smooth out the effects of population control revisions introduced in January 2000, 2003, and 2004.

Source: Bureau of Labor Statistics, Division of Labor Force Statistics, February 6, 2004

**Excel version of Household Survey Employment Smoothed for Population Controls, Seasonally Adjusted**

Box 3 used a variation of the smoothed household survey employment research series that was adjusted to be more similar in concept and definition to payroll employment. That series, which begins in January 1994, is provided below.

**Household Survey Employment Smoothed for Population Controls and Adjusted to a Payroll Concept, Seasonally Adjusted, January 1994 – January 2004**

(In thousands)

	January	February	March	April	May	June	July	August	September	October	November	December
1994	113,750	113,328	113,877	114,408	114,651	114,666	114,820	115,281	115,857	116,118	116,454	116,721
1995	116,832	117,174	117,096	117,144	117,276	117,479	117,789	117,710	117,782	117,817	117,755	117,936
1996	116,805	118,292	118,656	118,216	118,942	119,402	119,623	120,205	120,508	120,835	121,228	120,820
1997	120,709	121,233	121,619	122,285	122,432	122,887	123,293	123,321	123,347	123,637	123,926	123,998
1998	123,984	124,136	124,340	124,153	124,592	124,569	124,497	124,951	125,328	125,387	125,906	126,511
1999	126,748	126,737	126,806	126,773	126,893	126,943	127,082	127,295	127,383	127,892	128,321	128,482
2000	128,844	128,912	128,951	130,040	129,210	129,373	129,528	129,525	129,619	130,162	130,122	130,580
2001	130,210	130,159	130,186	129,813	130,070	129,820	130,359	129,662	129,826	129,132	129,015	129,079
2002	128,850	129,601	129,408	129,552	129,471	129,617	129,537	130,369	130,577	129,897	129,297	129,731
2003	129,767	129,747	129,736	129,979	129,837	129,926	129,727	129,846	129,670	130,084	130,254	130,252
2004	130,726											

NOTE: This series represents not seasonally adjusted household survey employment that has been revised from January 1990-December 2003 to smooth out the effects of population control revisions introduced in January 2000, 2003, and 2004.

The data from 1994 forward were then adjusted to an employment concept more similar to the payroll survey by subtracting from total employment agriculture and related employment, the self employed, unpaid family and private household workers, and workers on unpaid absences and then adding nonagricultural wage and salary multiple jobholders. The resulting employment series was then seasonally adjusted.

Source: Bureau of Labor Statistics, Division of Labor Force Statistics, February 6, 2004

**Excel version of Household Survey Employment Smoothed for Population Controls and Adjusted to a Payroll Concept, Seasonally Adjusted**

## **Benchmark revisions to the payroll survey**

Benchmark revisions are a standard part of the payroll survey estimation process. The benchmark adjustment represents a once-a-year re-anchoring of sample-based employment estimates to full employment counts available through unemployment insurance (UI) tax records filed by nearly all employers with State Employment Security Agencies.

The incorporation of March 2003 benchmarks published on February 6, 2004, led to a revision of all not seasonally adjusted data for the period subsequent to the last benchmark; that is, for April 2002 forward. Seasonally adjusted employment, hours, earnings series were revised from January 1999 forward.

### **March 2003 Benchmark Effects on the Nonfarm Payroll Series**

At the total nonfarm level, the March 2002 benchmark revision was a downward adjustment of 122,000 or -0.1 percent. Over the past 10 years, benchmark revisions have averaged 0.3 percent with a range from near zero to  $\pm 0.7$  percent.

Following standard BLS methodology, estimates were recalculated for the year preceding and the year following the March 2003 benchmark reference month. The March 2003 UI-based benchmark level replaced the March 2003 sample-based employment estimate. The difference between the benchmark level and the estimate was wedged back to the previous benchmark level; 1/12 of the difference was added to the April 2002 employment level, 2/12 to May 2002 and so forth, through February 2003, which received 11/12 of the difference.

Estimates for April 2003 forward were recalculated by applying over-the-month changes from the sample, along with recomputed net birth/death factors, and seasonal adjustment factors, to the new benchmark level.

Revisions for the most recent two months, November and December 2003, result from the effects of the benchmark process described above and the routine incorporation of additional sample receipts into the November final estimates and the second preliminary estimates for December.

The net impact of the benchmarking process for April 2002 through December 2003 is shown in the table below.

**Total nonfarm employment, seasonally adjusted, in thousands**

	Employment Levels			Over-the-month changes		
	Employment levels as previously published	Employment levels as revised	Difference	Over-the-month changes as previously published	Over-the-month changes as revised	Difference
2002						
April	130,415	130,379	-36	-66	-68	-2
May	130,411	130,381	-30	-4	2	6
Jun	130,383	130,406	23	-28	25	53
July	130,204	130,295	91	-179	-111	68
August	130,224	130,306	82	20	11	-9
September	130,289	130,259	-30	65	-47	-112
October	130,408	130,342	-66	119	83	-36
November	130,409	130,305	-104	1	-37	-38
December	130,198	130,096	-102	-211	-209	2
2003						
January	130,356	130,190	-166	158	94	-64
February	130,235	130,031	-204	-121	-159	-38
March	130,084	129,921	-163	-151	-110	41
April	130,062	129,901	-161	-22	-20	2
May	129,986	129,873	-113	-76	-28	48
June	129,903	129,859	-44	-83	-14	69
July	129,846	129,814	-32	-57	-45	12
August	129,881	129,789	-92	35	-25	-60
September	129,980	129,856	-124	99	67	-32
October	130,080	129,944	-136	100	88	-12
November	130,123	130,027	-96	43	83	40
December	130,124	130,043	-81	1	16	15