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

This report is updated monthly in conjunction with the release of the Employment Situation. The release dates are available on the BLS website.

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.

Employment estimates from both the household and payroll surveys are published in the Employment Situation news release each month. These estimates differ because the surveys have distinct definitions of employment and distinct survey and estimation methods. (See the comparison of the surveys on page 4.) This report is intended to help data users better understand the differences in the surveys' employment measures as well as divergences that sometimes occur in their trends.

Both the payroll and household surveys are needed for a complete picture of the labor market. The payroll survey provides a highly reliable gauge of monthly change in nonfarm payroll employment. The household survey provides a broader picture of employment including agriculture and the self employed.

Latest trends in payroll and household survey employment

Seasonally adjusted, numbers in thousands

| Reference period	Payroll survey employment [1]	Household survey employment [2]	Adjusted household survey employment [3]
Over-the-month change **December 2012 –January 2013**	157	-110	-351
Over-the-year change **January 2012–2013**	2,016	1,627	1,224
Since the business cycle peak [4] **December 2007–January 2013**	-3,217	-1,570	-1,820
Since the business cycle trough [4] **June 2009–January 2013**	4,247	3,792	3,597

[1] Payroll survey estimates for December 2012 and January 2013 are preliminary and subject to revision.

[2] The effects of level shifts from annual population control adjustments have been smoothed out in the historical household survey employment estimates used here; thus, the changes shown above will differ from those calculated using the official estimates in the Employment Situation and in the public databases available on the BLS website. See Appendix for further explanation.

[3] This is a research series created from household survey employment to be more similar in concept and definition to payroll survey employment. Household survey employment is adjusted by subtracting agriculture and related employment, the unincorporated self employed, unpaid family workers, private household workers, and workers absent without pay from their jobs, and then adding nonagricultural wage and salary multiple jobholders. The effects of annual population control adjustments also have been smoothed out in the historical data in this series.

[4] As designated by the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER).

Chart 1. Household and payroll survey employment, seasonally adjusted, 1994–2013
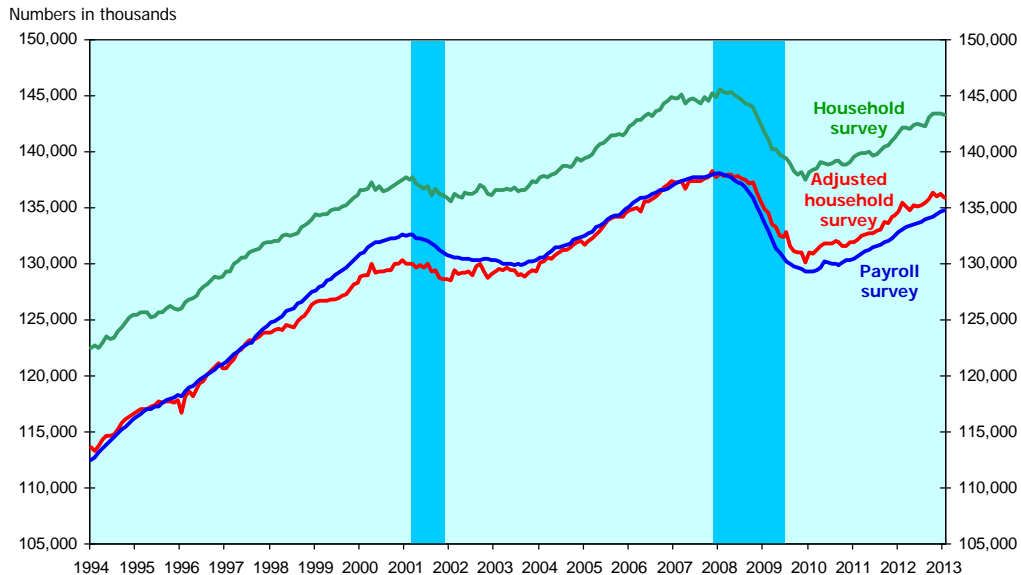
Numbers in thousands

Note: The household series presented here has been smoothed for population control adjustments. The "adjusted" household series has been adjusted to an employment concept more similar to the payroll survey's and smoothed for population control adjustments. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Source: Bureau of Labor Statistics, February 1, 2013.

Chart 1 shows employment from the household and payroll surveys from January 1994 through the most recent month available.

Because the household survey has a broader employment definition than the payroll survey, the household employment level (**green** line) exceeds that of the payroll survey (**blue** line).

For research and comparison purposes, BLS creates an "adjusted" household survey employment series (**red** line) that is more similar in concept and definition to payroll survey employment. The adjusted household survey employment series is calculated by subtracting 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 adding nonagricultural wage and salary multiple jobholders. The resulting series is then seasonally adjusted. (See Appendix for data series.)

The adjusted household survey employment tracks much more closely with the payroll survey measure; nonetheless, occasional trend discrepancies occur. For example, there is a noticeable period from the late 1990s until the 2001 recession when payroll employment grew at a faster rate than household survey employment. Possible causes of employment trend differences are discussed on pages 5-8.

Chart 2. Household and payroll survey employment, seasonally adjusted, March 2001–January 2013
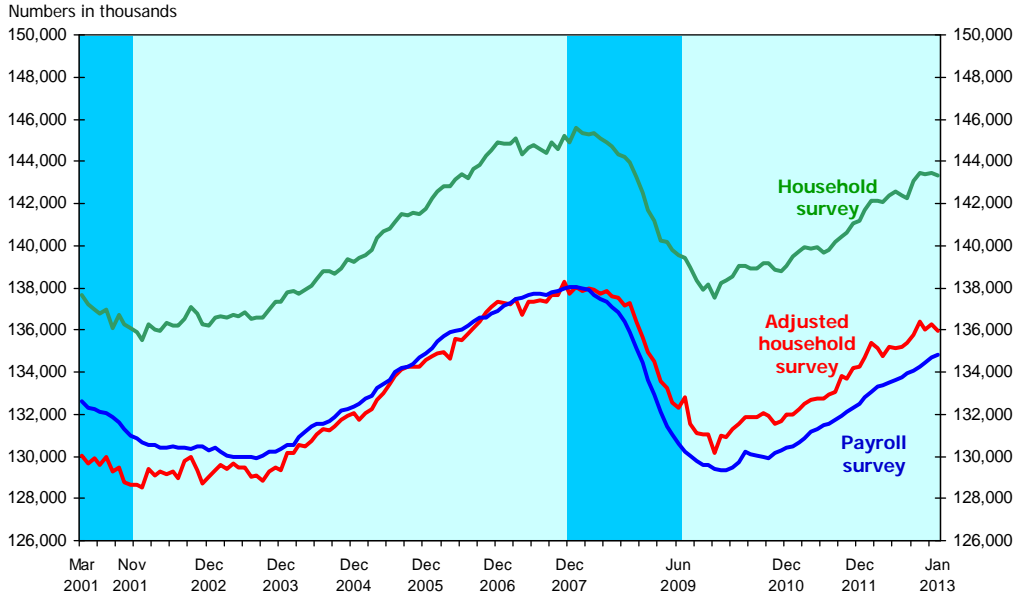
Numbers in thousands

Note: The household series presented here has been smoothed for population control adjustments. The "adjusted" household series has been adjusted to an employment concept more similar to the payroll survey's and smoothed for population control adjustments. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Source: Bureau of Labor Statistics, February 1, 2013.

Chart 2 shows the same payroll and household employment series as chart 1, but begins with the March 2001 onset of the previous recession period. The Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) has designated December 2007 as the most recent business cycle peak and June 2009 as the most recent business cycle trough.

Summary comparison of survey concepts, definitions, and methodologies

Major features and distinctions of the two surveys are shown below. Additional information on the methodologies of the two surveys can be found in the Quick Guide to Methods and Measurement Issues on the BLS website at http://www.bls.gov/bls/empsitquickguide.htm.

Comparison by:	Household Survey (CPS)	Payroll Survey (CES)
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 557,000 business establishments covering approximately one-third of total nonfarm employment
Major outputs	Labor force, employment, unemployment, and associated rates with demographic detail	Employment, hours, and earnings with industry and geographic detail
Reference period	Calendar week that includes the 12th of the month	Employer pay period that includes the 12th of the month (could be weekly, biweekly, monthly or other)
Employment concept	Estimate of employed persons (multiple jobholders are counted only once) Includes individuals absent from work without pay	Estimate of jobs (multiple jobholders counted for each nonfarm payroll job) Includes only those receiving pay for the reference pay period
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	$\pm$436,000	$\pm$91,700 (updated annually in February)
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

Comparing employment trends from the two surveys

Although the payroll and household surveys track well over the long term, periodic discrepancies in trend have occurred. The following sections summarize some issues with the surveys that are important to consider when comparing employment changes and trends from the two sources.

Sampling error

Both surveys are subject to sampling error. The payroll survey has a much larger sample size than the household survey. The payroll survey's active sample covers approximately 557,000 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. Over-the-month changes in household survey employment are therefore subject to larger sampling error, about four times that of the payroll survey on a monthly basis.

When looking at short-term trends in either survey, especially over-the-month changes, it is therefore essential to assess the statistical significance of the change. (The sizes of the over-the-month changes in employment needed to be statistically significant are shown on page 4.) 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 revisions

Benchmark revisions are a standard part of the payroll survey estimation process. The benchmark revision represents a once-a-year re-anchoring of the sample-based employment estimates to full employment counts derived primarily from unemployment insurance (UI) tax records that nearly all employers are required to file with State Employment Security Agencies. Following standard BLS methodology, the sample-based estimate for the month of March is replaced by the March UI-based employment level and estimates for the 12 months preceding and the months following the March benchmark reference month are recalculated. Estimates for the 12 months preceding the March benchmark are recalculated by wedging back the difference between the UI-based employment level and the sample-based estimate: 1/12 of the difference is applied to April of the prior year, 2/12 to May, and so forth, through February of the benchmark year which receives 11/12 of the difference. Estimates for April of the benchmark year forward are recalculated by applying the over-the-month changes from the sample to the new benchmark level, along with recomputed net birth/death factors. (See "New business births" below.)

The payroll survey's most recent benchmark—to March 2012 employment records—resulted in an upward adjustment of 424,000 (422,000 on a seasonally adjusted basis). Detailed information about this and previous benchmarks can be found on the BLS website at http://www.bls.gov/ces/tables.htm#benchmark.

Payroll survey benchmark, continued

With regard to the benchmark source data, BLS issued a report in 2004 evaluating the timeliness of new business enrollments into the UI system. The report, "Assessing the Timeliness of Business Births in BLS Establishment Statistics," is available on the BLS website at http://www.bls.gov/cew/eta581study.pdf.

New business births in the payroll survey

The payroll survey sample cannot include new firms immediately. These 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. A summary of how the birth/death model improves the payroll survey estimates is on the BLS website at http://www.bls.gov/opub/ils/pdf/opbils70.pdf.

Technical information about the birth/death model methodology used in the payroll survey estimates can be found at http://www.bls.gov/ces/cestn.htm#section5. The latest monthly adjustments resulting from the birth/death model are available at http://www.bls.gov/web/empsit/cesbd.htm.

Population control adjustments to the household survey

Population controls are used to weight the household survey sample results to reflect 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 with the intercensal population controls in part due to the difficulties associated with estimating the net international migration component of population change. The population controls contributed significantly to discrepancies between payroll and household survey employment in the 1980s and 1990s when the household survey showed less growth than the payroll survey due to understated population growth in the intercensal controls.

Population control adjustments, continued

With the release of January data each year, BLS incorporates population control adjustments into the household survey estimates. The adjustments reflect the Census Bureau's review of the components of population change since the last decennial census—births, deaths, and net international migration—and of the methodology used to estimate population. BLS typically does not revise the historical household survey data series to reflect new population controls because of the extensive effort needed to completely revise and verify all of the time series produced, and because the revisions would be negligible for most series. (Information on the specific effects of recent population control adjustments is found on page 9 of this report and on the BLS website at http://www.bls.gov/cps/documentation.htm#pop.)

Substantial revisions to the population controls in some years have created historical data comparability problems in some household survey data series, particularly the labor force and employment levels. In December 2003, BLS outlined a method to "smooth" such level shifts in major CPS data series as a convenience to its data users. See the Appendix, "Interpreting household survey employment data with population control adjustments," on pages 9-11 of this report.

Worker classification in the household survey

For research and comparison purposes, BLS creates an "adjusted" household survey employment series that is more similar in concept and definition to payroll survey employment. (This adjusted household survey employment series is featured in the charts and comparisons in this report.) The adjusted household survey employment series is calculated by subtracting 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 adding the number of nonagricultural wage and salary multiple jobholders.

This adjustment process is imperfect, however, because precise data are not available in some cases to make the best possible adjustment. For example, some independent contractors mistakenly report themselves as wage and salary workers, rather than as self employed, in the household survey. This leads to some overstatement of the adjusted household survey employment. Separately, the adjustment for multiple jobholding adds the number of workers whose primary job is nonagricultural wage and salary, but not necessarily their secondary job. Some may in fact be self employed in their secondary job. This, too, will cause some overstatement of the adjusted employment. On the other hand, BLS does not make an adjustment to account for the number of multiple jobholders with three or more jobs; the adjustment process presumes all multiple jobholders have only two jobs. This introduces some understatement into the adjusted household survey employment. These types of worker classification issues limit the ability of BLS 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.

Job changing

Employment estimates from the payroll survey are a count of jobs, unlike the household survey which provides a count of employed persons. If a person changes jobs and is on the payrolls of two employers during their pay periods that include the 12th of the month, both jobs would be counted in the payroll survey estimates.

If the rate of job-to-job movement changes substantially over time, it could impact trends produced from the payroll survey. While there is no method to directly measure effects from job changing, BLS researched this issue using job change rates from the household survey. The findings from this research are provided in the report "Effects of Job Changing on Payroll Survey Employment Trends" at http://www.bls.gov/ces/cesjobch.pdf.

Research on trend discrepancies

- Research that examined micro-level household survey data linked to employer-reported administrative data to identify sources of discrepancy between household and payroll employment was published in a National Bureau of Economic Research (NBER) Working Paper in March 2009. The paper is available from the NBER website at http://www.nber.org/papers/w14805.

- An article was published in the February 2006 *Monthly Labor Review* that discusses BLS research and findings on the divergence between the two surveys. The article is available on the BLS website at http://www.bls.gov/opub/mlr/2006/02/art2full.pdf.

- A summary of BLS research into the late 1990s discrepancy was presented to the Federal Economic Statistics Advisory Committee (FESAC) in October 2003. The paper is available on the BLS website at http://www.bls.gov/bls/fesacp2101703.pdf.

- In 2005, a FESAC subcommittee carried out its own review of the two surveys' employment measures at the request of BLS. The FESAC report to BLS is available on the BLS website at http://www.bls.gov/bls/fesacp2120905.pdf.

Appendix: Interpreting household survey employment data with population control adjustments

Conceptually, the adjustments to the population controls introduced into the household survey each year represent the cumulative over- or under-estimation of population since the last decennial census.

The following table shows the employment effect of population control adjustments made since January 2000.

Effect on household survey employment from population control adjustments, January 2000 and January 2003–2013

(In thousands)

Introduction of the Census 2000 base:	
January 2000……………………	+1,555
Adjustments to the Census 2000 base:	
January 2003……………………	+576
January 2004……………………	-409
January 2005……………………	-45
January 2006……………………	-123
January 2007……………………	+153
January 2008……………………	-598
January 2009……………………	-407
January 2010……………………	-243
January 2011……………………	-472
Introduction of the 2010 Census base:	
January 2012……………………	+216
Adjustment to the 2010 Census base:	
January 2013……………………	+127

The usual BLS practice is to introduce the entire population adjustment amount into the January data each year, without making retroactive revisions to apply the adjustment back to the decennial census base year. In years when the population adjustments are large, this can result in significant shifts in the January labor force and employment levels that can be problematic for data analysis. When calculating changes in the employment level over certain time periods, for example, a level shift due to a population adjustment may distort the actual trend.

Consequently, as a convenience to its data users, BLS created a research series that smoothes out the level shifts in employment resulting from population control adjustments made from January

2000 forward. The population adjustments are wedged back incrementally to the previous decennial census base year, rather than incorporating the entire change in January of the years that they were implemented. For more information, see the technical documentation on the BLS website at http://www.bls.gov/cps/cpspopsm.pdf. In the current research series, data from 1990–1999 were smoothed for the Census 2000 population control adjustment; data from 2000–2010 were smoothed for the intercensal adjustments to the Census 2000 population base that occurred in January 2003–2011; data from 2000–2011 were smoothed for the 2010 Census population adjustment made in January 2012; and data from 2010–2012 were smoothed for the intercensal adjustment to the 2010 Census population base made in January 2013. The full series is shown in the following table. This household survey employment research series was used in Charts 1 and 2 and the box on page 1 to provide a clearer picture for analysis. Users should be aware that this research series will not match the official household survey employment estimates in BLS publications and on the BLS website.

Household Survey Employment Smoothed for Population Controls, Seasonally Adjusted,

January 1990–December 1999 and January 2000–December 2012

(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	136,552	136,585	136,681	137,243	136,597	136,900	136,485	136,609	136,833	137,022	137,249	137,534
2001	137,691	137,519	137,683	137,193	136,979	136,754	136,945	136,109	136,707	136,246	136,086	135,889
2002	135,536	136,266	135,998	135,941	136,347	136,216	136,207	136,492	137,082	136,781	136,289	136,187
2003	136,580	136,622	136,552	136,727	136,616	136,838	136,501	136,553	136,590	136,940	137,354	137,318
2004	137,771	137,827	137,724	137,935	138,092	138,398	138,763	138,766	138,666	138,895	139,377	139,257
2005	139,407	139,533	139,786	140,369	140,708	140,798	141,094	141,486	141,439	141,571	141,508	141,746
2006	142,251	142,544	142,814	142,821	143,135	143,385	143,222	143,630	143,806	144,289	144,495	144,915
2007	144,807	144,821	145,068	144,326	144,626	144,770	144,599	144,364	144,907	144,597	145,226	144,892
2008	145,583	145,354	145,276	145,314	145,083	144,905	144,693	144,358	144,223	143,943	143,237	142,502
2009	141,692	141,180	140,256	140,183	139,778	139,530	139,419	138,999	138,326	137,935	138,174	137,532
2010	138,190	138,376	138,520	139,049	139,010	138,904	138,925	139,164	139,148	138,859	138,809	139,059
2011	139,495	139,718	139,896	139,864	139,944	139,672	139,781	140,148	140,447	140,603	141,066	141,196
2012	141,695	142,110	142,115	142,032	142,404	142,553	142,359	142,276	143,090	143,448	143,401	143,432

Note: This is a research series and will not match the official employment estimates in BLS publications or the BLS website databases.

This research series reflects seasonally adjusted household survey employment levels that have been smoothed to minimize the effects of level shifts

from population control adjustments in the official series in January 2000 and January of 2003–2013.

Source: Bureau of Labor Statistics, February 1, 2013.

The "adjusted" household survey employment research series used in Charts 1 and 2 and the box on page 1 is a variation of the smoothed household survey employment research series that has been adjusted to be more similar in concept and definition to payroll employment. That series, which begins in January 1994 and is updated monthly, is provided below.

Household Survey Employment Smoothed for Population Controls and Adjusted to a Payroll Concept, Seasonally Adjusted, January 1994–January 2013

(In thousands)

	January	February	March	April	May	June	July	August	September	October	November	December
1994	113,684	113,268	113,797	114,366	114,603	114,661	114,826	115,260	115,800	116,101	116,345	116,565
1995	116,763	117,097	117,018	117,094	117,226	117,443	117,750	117,667	117,720	117,766	117,661	117,817
1996	116,727	118,208	118,582	118,144	118,873	119,334	119,547	120,141	120,435	120,760	121,146	120,716
1997	120,629	121,144	121,532	122,202	122,348	122,804	123,192	123,238	123,276	123,553	123,839	123,888
1998	123,888	124,044	124,253	124,055	124,499	124,470	124,362	124,848	125,252	125,292	125,820	126,380
1999	126,638	126,653	126,721	126,680	126,798	126,833	126,904	127,166	127,296	127,784	128,227	128,331
2000	128,821	128,921	128,930	129,982	129,171	129,327	129,332	129,388	129,477	130,024	129,967	130,342
2001	130,043	130,042	130,015	129,635	129,883	129,622	129,950	129,305	129,448	128,803	128,662	128,636
2002	128,540	129,421	129,109	129,260	129,162	129,272	128,933	129,781	129,953	129,323	128,699	129,037
2003	129,354	129,596	129,412	129,631	129,471	129,480	129,010	129,113	128,864	129,256	129,442	129,316
2004	130,136	130,186	130,516	130,445	130,754	131,023	131,306	131,215	131,445	131,746	131,908	132,018
2005	131,759	132,037	132,229	132,660	132,975	133,418	133,810	134,128	134,222	134,227	134,254	134,562
2006	134,736	134,866	134,976	134,644	135,596	135,528	135,820	136,073	136,398	136,806	137,068	137,333
2007	137,283	137,223	137,435	136,720	137,364	137,355	137,425	137,367	137,669	137,671	138,288	137,747
2008	138,013	137,872	137,980	137,899	137,730	137,849	137,609	137,512	137,145	137,295	136,383	135,612
2009	134,932	134,526	133,566	133,246	132,554	132,330	132,791	131,558	131,089	131,048	131,017	130,147
2010	131,004	130,907	131,275	131,536	131,850	131,855	131,842	132,018	131,913	131,550	131,644	131,965
2011	131,960	132,210	132,457	132,664	132,737	132,728	132,919	133,054	133,796	133,674	134,177	134,269
2012	134,703	135,407	135,122	134,726	135,185	135,109	135,201	135,405	135,748	136,383	136,005	136,278
2013	135,927											

Note: This series represents household survey employment that has been adjusted to an employment concept more similar to the payroll survey by subtracting from total not seasonally adjusted employment agriculture and related employment, the unincorporated self employed, unpaid family workers, private household workers, and workers on unpaid absences and then adding nonagricultural wage and salary multiple jobholders.
The series was then smoothed to minimize the effects of level shifts from population control adjustments in January 2000 and January of 2003–2013.
The resulting employment series was then seasonally adjusted.

Source: Bureau of Labor Statistics, February 1, 2013.

http://www.bls.gov/web/ces_cps_trends.pdf