Measuring Total Employment: Are a Few Million Workers Important?

by Mark Schweitzer and Jennifer Ransom

Each month employment reports are eagerly awaited by economic analysts and small and large investors alike. The *Employment Situation Report* provided by the Bureau of Labor Statistics (BLS) reports both the unemployment rate and the total number of jobs in the economy; both statistics indicate the overall health of the economy.

The significance of the numbers released in the *Employment Situation Report* is evident by the immediate reaction generated in the media by its release. Here is an example of a news report reacting to an *Employment Situation Report* release in which the unemployment rate fell and jobs grew at a strong rate.

"Stocks rebounded today after a steep decline on Thursday as a strong employment report provided fresh evidence of the nation's economic resiliency."

— *Chicago Sun-Times,*
December 4, 1998

Interpreting and reacting to the releases is not always clear cut. For example, consider the following news bulletin that appeared after the release of the June 1999 *Employment Situation Report.*

"The economy is still roaring ahead, creating more than a quarter-million new jobs in June everywhere from amusement parks to banks.

Though the overall unemployment rate crept up to 4.3 percent, all industries except manufacturing and mining posted solid gains."

— *Cincinnati Post,*
June 5, 1999

At first glance, this report seems to contradict itself: It appears that more people who want to work were unable to find jobs, but the number of people on payrolls in the economy actually rose. Has there been some mistake?

No—seemingly contradictory differences are possible. For example, both employment and the unemployment rate can fall at the same time. One source of the discrepancies is that the BLS publishes two distinct measures of employment.[1]

To compute the unemployment rate, the BLS surveys households to determine how many people are working and how many are looking for work, but unable to find jobs. Then, to calculate the total number of jobs in the economy, the BLS surveys establishments to determine how many workers are on their payrolls.

Employment as reported by establishments and employment as reported by households are slightly different measures by design, but the two measures typically move together. Over the last few years, however, these two series have

How can we measure total employment in the economy? The Bureau of Labor Statistics provides two different—and sometimes contradictory—measures of this key indicator. During the 1990s, the gap between the two measures has widened to more than five million workers. This *Economic Commentary* examines the current discrepancy between the two measures of employment and explores its significance in interpreting our economy's health.

shown considerable differences (see figure 1). In 1998, employment as measured by establishments rose 2,923,000, but increased only 1,888,000 as measured by households. Although particularly large differences became obvious in 1998, the phenomenon has been substantial since 1993. During the 1990s, the difference between the two employment series has accumulated to 5,869,000 workers.

This *Economic Commentary* examines the current discrepancy between the two measures of employment, discusses the reasons for its existence, and explores its significance in interpreting the health of the economy. Certainly, a discrepancy of more than five million workers is important to our interpretation the economy's health. Unfortunately, though, there is no easy way to determine which measure is more accurate; therefore, we must consider the implications of each measure individually.

■ Differences in Survey Design
Current Employment Statistics (Establishment) Survey

The two employment measures reported by the BLS are computed from different surveys, resulting in some inevitable differences due to survey design. The employment report that is often referred to as "nonfarm payrolls," or establishment survey employment, is compiled from the *Current Employment Statistics Survey* (CES). This survey collects payroll data from a sample of nearly 400,000 businesses each month. In addition to employment, the CES also measures hours and earnings for the nation, states, and major metropolitan areas. CES employment measures all persons on (nonfarm) establishment payrolls who have received wages for the pay period that includes the twelfth day of the month.

Because the CES focuses on the *number* of jobs, the survey counts full- and part-time workers equally. Temporary employees, workers on paid sick leave or paid vacation, and workers receiving severance payments are included. Employees who are on strike, whose jobs have been terminated, or who worked only part of the pay period are also included. Workers on multiple establishments' payrolls, whether they have switched jobs or are working more than one job, are counted once for each establishment. In sum, each worker who was paid by a surveyed establishment for full- or part-time work during any part of the survey period is counted as employed.[2]

In addition to the survey design, some of the differences between the two measures may be attributable to the sampling systems used by the surveys. Over the course of the year, the BLS does not adjust its sample size to account for newly opened or closed establishments, which may lead to a mismeasurement of total payrolls. However, the BLS takes care to compensate for this variable: Although the CES surveys only a portion of all establishments, the BLS benchmarks the survey results annually, based on unemployment insurance (UI) tax records collected by state employment security agencies for more than seven million establishments (approximately the full population count). Employees reported in UI records account for approximately 98 percent of total nonfarm employment.

Annual benchmarking allows the BLS to ensure the sample accurately reflects the total number of jobs in the economy. Benchmarking for 1998 took place in June 1999. For March 1998, for example, payroll employment was revised upward by 47,000 jobs (less than 0.1 percent). The BLS reports that over the last decade, revisions resulting from benchmarking have averaged just 0.3 percent. Due to the small size of the revisions, benchmarking the 1998 data did not affect the comparability in the growth rates of the two employment series.[3]

Current Population (Household) Survey

The second measure of employment, referred to as "household employment," is derived from the *Current Population Survey* (CPS). Household employment numbers are used to calculate the unemployment rate (unemployed / employed + unemployed). CPS data are collected from a sample of approximately 50,000 households selected as representative of the U.S. population. These households' responses are weighted by the Census Bureau according to population estimates and noninterview rates to represent the nation.

The CPS is designed to obtain labor force information for the week that includes the twelfth day of the month for persons in the surveyed household who are at least 16 years old. This survey counts as employed each person who worked for pay or profit or who worked at least 15 hours at a family-operated enterprise during the survey week.

But a closer inspection of the definition of "employed" in the household and establishment surveys reveals that the CPS considers some workers to be employed that are not counted in the CES. For instance, the CPS includes individuals who have jobs but were not at work (whether absent with or without pay) as employed. In addition to those absent from work without pay, the CPS

FIGURE 1   EMPLOYMENT GROWTH, 1991–98

Percent change, year-over-year
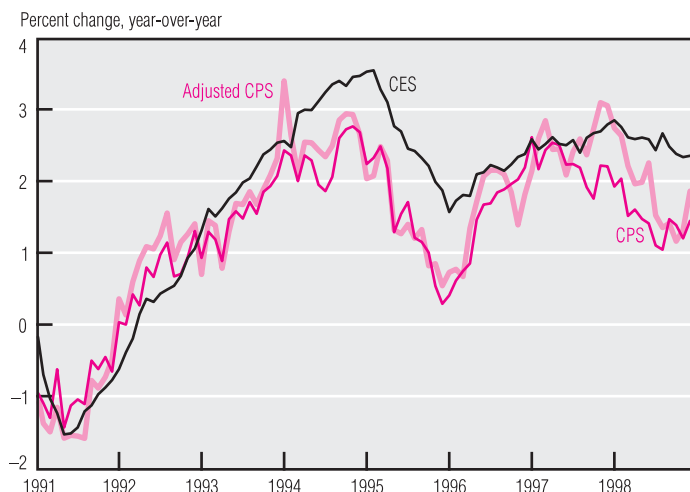
SOURCE: U.S. Department of Labor, Bureau of Labor Statistics; and authors' calculations.

includes agricultural workers, self-employed workers, unpaid family workers, and private household workers as employed. These people are not on establishment payrolls, and therefore are not counted as employed by the CES. Due to distinctions in defining "employed" in each survey, the reported monthly employment from the two sources may be different.

The primary statistic of interest from the CPS is the unemployment rate, although a measure of employment is also reported. The BLS and the media tend to focus on nonfarm payrolls, or employment reported by the CES, because CPS employment fluctuates widely from month to month (a consequence of the sample size). The CPS sample of 50,000 households is not large enough to produce employment figures without substantial statistical sampling errors; indeed, the BLS estimates that sampling errors amount to 312,000 workers monthly. However, an average of three months of CPS employment estimates will typically yield a reasonably accurate employment number. Similarly, errors should not linger more than a few months. Regardless, the current divergence in the growth rates of the two employment series has persisted for too long to be attributed to CPS sampling errors.

■ **The Difference after Corrections**

The CPS collects data not only on those who are employed and unemployed, but also on characteristics of the labor force; this data may be utilized to eliminate some of the conceptual differences between the CPS and the CES.

The characteristic information in the CPS tells us whether an employed person worked in the agricultural sector, worked in private household production, or was self-employed. The CPS also delineates the number of multiple job-holders. Table 1 examines the subgroups of employed persons that do not appear in both surveys and the number of these workers in the economy in 1998. Last year, workers not counted by the CES made up about 16 percent of total employment as measured by the CPS.

The CPS may be made to more closely match the CES by subtracting those workers not count as employed in the CES. Figure 1 shows the growth rate for this adjusted CPS employment measure. The adjustments, while substantial, do not eliminate the discrepancy. Over the 1990s, the adjusted figures show a difference of 4,663,000 workers compared with an unadjusted difference of 5,869,000.[4]

Furthermore, accounting for the measured differences in the two employment statistics does not readily correct the recent differences in their growth rates. Since 1990, employment growth as shown by the CPS has slowed rapidly from 2.8 percent per year (year-over-year) to just above 1 percent in July 1998; according to the CES, however, employment growth remained above 2 percent (year-over-year).

Even when CPS employment is adjusted to approximate the CES definition of employment, the differences in the series remain substantial. Because the BLS carefully constructs both series and revises the data often, the source of the discrepancy is not readily apparent. However, the difference between the two numbers is significant because it alters our perception of the health of the U.S. economy.
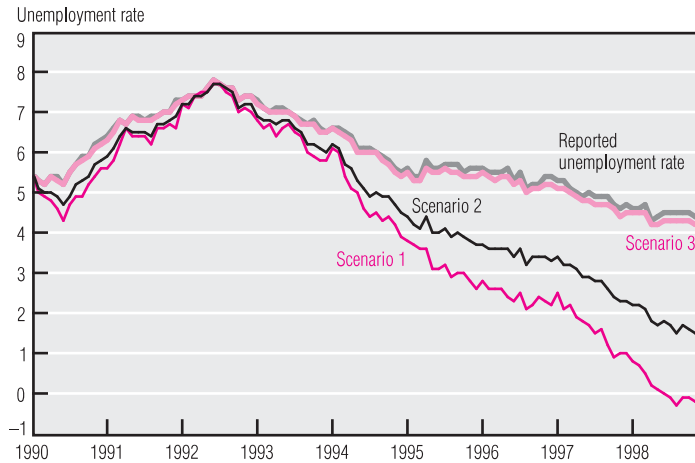
■ **Implications**

Aside from producing confusing employment reports of simultaneous increases in jobs and in unemployment, the large discrepancy between the employment measures may affect other key statistics as well, notably the unemployment rate and labor productivity figures.

Unemployment Rate

The unemployment rate is defined as the number of unemployed persons divided by the number of workers in the labor force (either working or unemployed). Because the unemployment rate is calculated from household employment estimates (CPS), we can measure the discrepancy's effect on unemployment only by recalculating the unemployment rate using the higher employment growth rate shown by the establishment survey.

Higher employment lowers the unemployment rate, but to determine the precise effect of an increase in employment, we need to know the prior status of the additional employed workers. This information, however, cannot be determined, so we must rely on assumptions.[5] By the simplest assumption (figure 2, scenario 1), all of the additional workers are drawn from the ranks of the unemployed.[6] In this case, though, the unemployment rate would have fallen even further over the past few years. Indeed, if we assume that the problem began in 1990, then the implied unemployment

FIGURE 2   IMPLICATIONS FOR THE UNEMPLOYMENT RATE

Unemployment rate

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics; and authors' calculations.

FIGURE 3   PRODUCTIVITY GROWTH, 1990–98
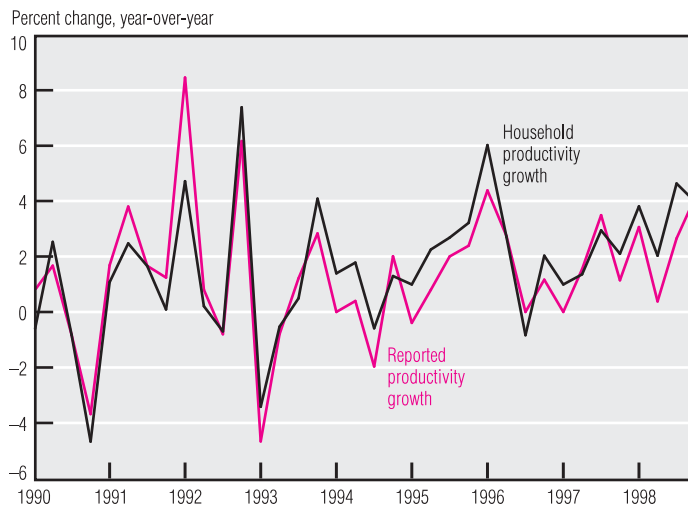
Percent change, year-over-year

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics; and authors' calculations.

It is possible to minimize the impact of higher CES employment gains on the unemployment rate, if the additional workers are drawn entirely from people who were previously out of the labor force. This leaves the number of unemployed workers unchanged, but still results in a slightly lower unemployment rate (figure 2, scenario 3).[8] While the unemployment rate is little changed, the implied labor force participation rate rises well above its all-time high of 67.3 percent (achieved in January 1998) to 70.2 percent. This is unlikely, as it would have required the fastest increase in labor force participation ever recorded.

Finally, the population estimates that are used to adjust the sample estimates to represent the nation could be too low. If the population estimates were about 5 percent too low, then employment estimates from the household survey would approximate the establishment counts, with essentially no change in the unemployment rate. There is precedent for substantial correction following the decennial censuses. Incorporating the 1990 census results, for instance, raised the household employment count by approximately one million workers.

Productivity
The most commonly reported productivity measure, *nonfarm business output per hour,* is constructed from CES employment figures. The formula divides a real output index by employment, multiplied by average hours worked. Productivity is a crucial indicator because, in the long run, productivity growth provides real wage gains for workers.[9] What would this measure of productivity gains look like if the workforce had been expanding at the slower rate indicated by the CPS?

Figure 3 shows estimated productivity growth in the 1990s if nonfarm business employment had grown at the slower rate shown in the CPS survey. We have assumed for this calculation that the data on average hours are correct for the

rate at the end of 1998 would have been negative (–0.3 percent). This is clearly impossible, but it does highlight the substantial implications of the discrepancy in the employment measures.

A more reasonable assumption is that the additional workers are drawn both from the ranks of the unemployed and from outside the current labor force. In fact, one-third of net employment gains (as measured in the CPS) in the 1990s represent workers who were previously

counted out of the labor force—neither unemployed (looking for work) nor employed. Applying this proportion to the employment discrepancy yields scenario 2 (figure 2).[7] In this case, the implied unemployment rate still falls, but remains above zero. Although today's unemployment rates are historically low, this scenario shows just how low they could be if CES employment gains are correct.

now-smaller employed population and that output measurements are also unaffected.[10] On average, productivity growth has been understated if the CPS employment figures are correct—2.0 percent gains versus reported gains of 1.3 percent since 1990. Interestingly, though, the pattern is not uniform. During the recession early in this decade, the CPS showed slightly larger employment gains and thus smaller productivity gains. Over 1998, the far slower gains in employment shown by the CPS would translate into continued strong productivity—on average, an extra percentage point for the year. Of course, if the discrepancy is due entirely to an error in the household data (for example, if the population counts are too low), then our current productivity estimates would remain unchanged when the difference is eliminated.

The other series in the productivity report would be similarly altered. For example, the unit labor cost index (the average expense necessary to produce a unit of real output) would rise less over the late 1990s. The overall implication of overestimating employment is that firms are getting more production from their workforce, potentially contributing to either faster wage growth or higher corporate profits.

■ Conclusion
Discrepancies in the two measures of employment must be resolved if employment is to paint an accurate picture of the U.S. economy's health. Currently, the measures present very different pictures of the economy. The CES suggests little slowdown in employment growth in 1998 and generally reveals more employment growth. Should this growth have led to an even lower unemployment rate? That depends on the source of the discrepancy. A growing population underestimation would allow for higher employment growth without tightening. If, on the other hand, these workers were drawn from an accurately measured population, then strong U.S. labor markets are employing even a greater fraction of the labor force.

If the CPS is correct, the economy still looks healthy, but there was a substantial slowdown in employment growth in 1998. The CPS account is more reassuring for those who fear a reignition of inflation by excessively tight labor markets. This slowing was not seen in the gross domestic product account, so productivity gains would have been even more pronounced. Higher productivity figures would also have allowed firms to maintain or expand their profit margins while offering real wage increases.

Simple accounting solutions for these differences leave a substantial discrepancy, both in the absolute numbers and in the timing of employment growth. Ultimately, the BLS will have to resolve the differences with further study; until the issue is resolved, however, it represents an important source of uncertainty for the status of the U.S. economy.

■ Footnotes
1. Both employment and the unemployment rate may move in the same direction at times due to the changing size of the labor force.

2. Bureau of Labor Statistics, *CES Scope,* available at http://stats.bls.gov/cescope.htm.

3. Bureau of Labor Statistics, *Preliminary 1998 Benchmark Revision,* available at http://stats.bls.gov:80/cesbm98.htm.

4. The adjustment accounts for known differences in the procedures where published data is available. Further estimates could be made to reduce the gap, based on unreleased data collected by the Census Bureau or assumptions about the nature of the shortcomings of either of the surveys. To our knowledge, no source has eliminated the puzzling discrepancy.

5. Calculations for these scenarios were made using CPS and CES unemployment as reported by the BLS without adjustment.

6. To calculate the unemployment rate in scenario 1, the number of unemployed persons was reduced by the employment discrepancy, while the size of the labor force was left at its reported level.

7. In scenario 2, the level of unemployment was calculated by subtracting two-thirds of the employment discrepancy from household unemployment and increasing the labor force by the total employment discrepancy.

8. In scenario 3, the standard household unemployment level is divided by the sum of household unemployment and the implied establishment employment.

9. See Mark Schweitzer, "Wage Inflation and Worker Uncertainty," Federal Reserve Bank of Cleveland, *Economic Commentary,* August 15, 1997, for a breakdown of the factors contributing to wage growth.

10. Both of these assumptions could be incorrect. The additional workers measured in the CES could have, on average, higher or lower hours of work. Certain preliminary estimates of output in difficult-to-measure service industries are derived from employment estimates. Nonetheless, these seem to be appropriate baseline estimates.