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Explaining the Recent Divergence in Payroll and Household Employment Growth

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Each month, the government releases two estimates of U.S. employment growth—one based on a survey of firms, the other on a survey of households. Since 1994, these measures have diverged sharply. Evidence suggests that the household survey's estimate has risen more slowly because it undercounts working-age adults who have found employment during the current economic expansion.

In recent years, two prominent government surveys—the payroll survey and the household survey—have given strikingly different estimates of employment growth.¹ From 1994 through third-quarter 1999, the payroll survey showed an employment increase of nearly 16 million, while the household survey indicated a rise of just 12 million. Significantly, the difference in employment levels reported in the payroll and household surveys—the “employment gap”—has more than doubled over this period, from 3 1/2 million to 7 1/2 million.

In this edition of *Current Issues*, we seek an explanation for the recent increase in the employment gap by investigating the historical behavior of the employment estimates and examining the design and construction of the surveys themselves. We consider three possible reasons for the growing divergence of the employment estimates: the surveys' differing treatment of multiple jobholding, upward adjustments to the data in the payroll survey, and an undercount of the working-age population in the calculation of the household survey estimates.

We find that the third explanation—an underestimated working-age population—best accounts for the recent rise in the employment gap. Since the household survey calculates the level of employment by combining survey data with a census-based estimate of the U.S. working-age population, an undercount of that population will produce

low employment numbers. Evidence suggests that the census has in fact historically underestimated this population. Significantly, the undercount appears to be highest among groups whose employment status is very sensitive to business cycle fluctuations. We contend that the steady

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expansion of the economy in the 1990s has enabled these cyclical workers to find employment. Their numbers, only partly captured in the census—and, by extension, in the household survey—have in recent years helped to boost the job count in the payroll survey, widening the gap between the surveys' employment estimates.

The Gap between Payroll and Household Employment

In assessing the employment gap, we focus on the two most comparable categories of employment across the surveys—private nonfarm payroll employment from the payroll survey and private nonagricultural wage and salary employment, excluding the domestic services

Payroll versus Household Employment

Third-Quarter 1999

Category	Employment (Thousands)
Payroll survey	
Nonfarm payroll employment	128,916
Private	108,726
Government	20,190
Household survey	
Total employed	133,423
Agriculture	3,216
Wage and salary	1,922
Self-employed	1,246
Unpaid family	45
Nonagriculture	130,207
Wage and salary	121,273
Government	19,147
Private, excluding domestic services	101,174
Domestic services	951
Self-employed	8,908
Unpaid family	88

Source: U.S. Department of Labor, Bureau of Labor Statistics.

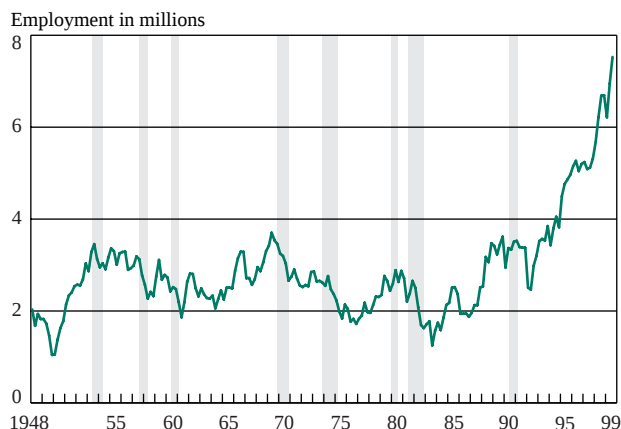
Note: Because of seasonal adjustment factors, components do not always sum to totals.

sector, from the household survey (see the highlighted entries in the table).² The difference between the employment figures reported for these two categories since 1948 is plotted in Chart 1. Although the gap has averaged about 3 million over the period, it soared to more than 7 million in 1999.

The chart does, however, give a somewhat misleading impression of the gap, because overall employment has also grown tremendously during this period. Private nonfarm payroll employment, for example, increased from 39.2 million in 1948 to 108.7 million by the third quarter of 1999. To understand how this employment increase affects the gap, we recalculate the difference between the two series in relation to total employment.³

Computed in this way, the recent gap between the surveys is certainly less dramatic (Chart 2). The difference in the employment figures for our two categories is smaller than it was during the early 1950s and about the same size as it was in the 1960s. Nevertheless, the increase in the gap in the 1990s is still sufficiently pronounced to require explanation: Now more than 7 percentage points, the gap easily exceeds the mean difference of 4.6 percentage points observed for the 1948-99 period as a whole.

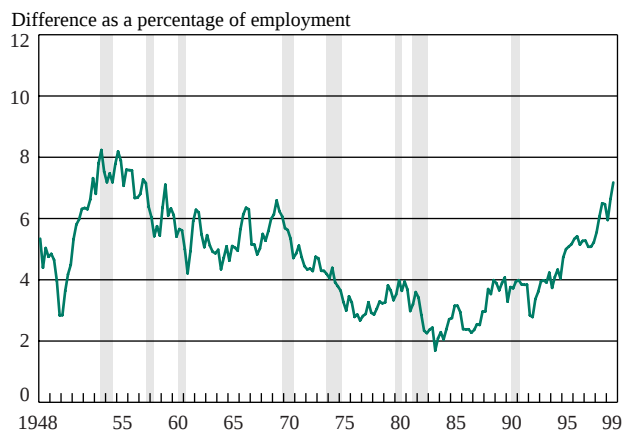
Another pattern evident in the charts is the link between the size of the gap and changes in the business cycle. Payroll employment growth has outpaced household employment growth most markedly during periods

Chart 1**The Gap between Payroll and Household Employment**
Payroll Minus Household

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Notes: The shaded areas denote periods designated recessions by the NBER. The chart plots the difference between the payroll survey's estimate of private nonfarm payroll employment and the household survey's estimate of private nonagricultural wage and salary employment, excluding domestic services.

of economic prosperity and low unemployment; the gap has narrowed during periods of recession or high unemployment. In keeping with this pattern, the recent rise in the employment gap has occurred during a period of steady economic expansion and low overall unemployment.⁴ The correlation between the gap and unemployment suggests that the explanation we are seeking for the conflicting survey estimates of employment will also clarify the cyclical behavior of the gap.

Chart 2**Percentage Gap between Payroll and Household Employment**

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Note: The shaded areas denote periods designated recessions by the NBER.

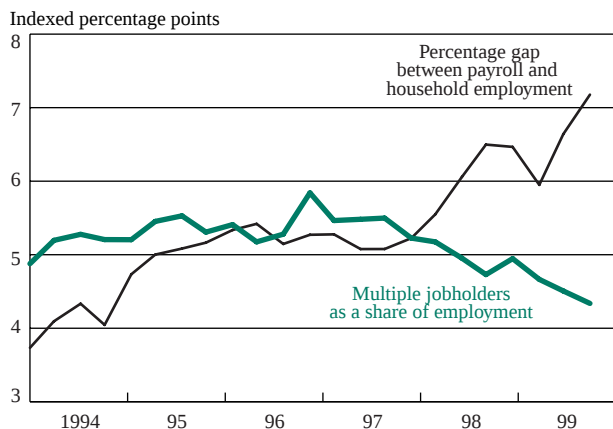
Multiple Jobholding

Multiple jobholding appears to offer a simple and reasonable explanation for the employment gap. The employment increases reported in the payroll survey are likely to exceed those reported in the household survey because the payroll survey counts the number of jobs in the economy while the household survey counts the number of employed people. Since many workers hold more than one job, the payroll survey would be expected to yield higher estimates of employment.

But can multiple jobholding explain the recent increase in the gap between the survey estimates? To explore the extent of this factor's role in the employment gap, we look at household survey data compiled since 1994 on the multiple jobholding of respondents.⁵

We find that while multiple jobholding can indeed explain the employment gap on average, it offers a poor explanation for the recent increase (Chart 3). The share of workers who hold multiple jobs has averaged just under 6 percent since 1994, a fact that would more than account for the mean difference of 4.6 percentage points between the two employment series. However, the 6 percent share is quite consistent with the share of multiple jobholders in the years before 1994, when the difference in the survey estimates was not especially marked.⁶ In addition, since 1997 multiple jobholders' share of total employment has actually declined, while the employment gap has continued to rise. The contrasting behavior of these trends confirms that multiple jobholding by itself cannot account for the recent increase in the employment gap. Further evidence that this explanation does not "fit" is the lack of correspondence between the change in the number of multiple jobholders over time and the gap's strong cyclical behavior.

Chart 3
Multiple Jobholders as a Share of Private Nonfarm Employment



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

Payroll Data and the Possibility of Overcounting

Another possible explanation for the rising employment gap is overestimation of employment in the payroll survey. Some commentators have suggested that the method used by the Bureau of Labor Statistics (BLS) to calculate the payroll job numbers may lead to overcounting.⁷

A look at the construction of the survey suggests that the BLS takes great care to arrive at accurate estimates. When compiling the payroll data, the BLS collects information from nearly 400,000 establishments—a large sample encompassing roughly 37 percent of total nonfarm employment. The numbers from this sample are scaled up to provide prompt monthly estimates of the number of jobs held in the nation as a whole. Then, in March of each year, the BLS revises its estimates by comparing them with a complete set of administrative records from the state unemployment insurance system. The records cover a full 98 percent of U.S. nonfarm employment, and supplemental sources are used to estimate the remaining 2 percent. The rigor of the entire process—particularly the annual benchmarking of the survey findings against administrative records—makes persistent overestimation of payroll employment highly unlikely.

Questions have been raised, however, about the use of a "bias adjustment factor" in the computation of preliminary survey estimates (Epstein 1993; Koretz 1994; *Wall Street Journal* 1996). Because the payroll survey cannot capture the employment changes that result from the formation of new firms or the closing of existing firms, the BLS uses information on past growth to adjust the sample-based estimates of jobs held.⁸ In the recent period, when employment has been rising fairly steadily, the estimates have most often been adjusted upward to compensate for the survey's inability to capture the jobs created at many new firms. Critics have suggested that this bias adjustment may overcorrect the sample-based estimates, leading to inflated measures of employment growth. Others have noted that an adjustment factor based on information about past employment growth is unlikely to anticipate economic downturns and the resulting job losses.⁹

Our review of the data suggests that the bias-adjusted numbers have not, in fact, overstated employment increases in recent months. Under the latest benchmark revisions, preliminary estimates of payroll employment were actually raised by 60,000 jobs.¹⁰ In addition, a comparison of the preliminary and revised estimates of payroll employment since 1979 shows no systematic bias in the initial estimates. Beginning in 1992, revised payroll employment was consistently higher than the original estimates. Although payroll employment was revised downward in the two most recent recessions,

1982-83 and 1990-91, the benchmark revisions as a group exhibit no clear cyclical pattern. For example, the payroll employment figures were revised downward even during the strong expansionary economy of the late 1980s. Accordingly, we find no consistent evidence that the bias adjustment factor has exaggerated employment growth or performed poorly as a predictor of economic slowdowns.

Household Data and the Undercount of the U.S. Working-Age Population

A much more likely source of measurement problems is the household survey. This survey's sample of roughly 47,000 households is much smaller and less representative than the payroll survey's sample.¹¹ Moreover, because the Bureau of Labor Statistics benchmarks the household data to the U.S. census, the benchmarking process can occur only every ten years, compared with the payroll data's annual benchmarking.

The Census Link: A Key to the Employment Gap

The household survey's tie to census data may very well explain why this survey has provided much lower estimates of employment than the payroll survey. To calculate the level of household employment in the nation as a whole, the BLS multiplies the percentage of employed individuals in its sample by an estimate of the U.S. working-age population. This estimate is based on figures from the previous census.¹² Use of the census count of the working-age population poses two problems. First, because the census is conducted only at ten-year intervals, the BLS must rely on a base figure that becomes increasingly uncertain as the decade advances. Second, demographic analysis of births, deaths, and net migration records provides strong evidence that the census has repeatedly underestimated the working-age population in the past several decades. The undercount in the 1940 census was especially severe: as much as 5.4 percent of the population was overlooked. Although the estimated undercount of 1.2 percent in the 1980 census indicated a significant improvement in accuracy, the trend reversed itself when the 1990 census missed an estimated 1.8 percent of the population.¹³

To gauge how increases in the estimated working-age population affect household employment and the gap, we examine the revisions to household employment following the 1980 and 1990 census counts of the U.S. population. Although the census in both years underestimated the number of working-age people, it produced an estimate of the increase in this population that exceeded the increase projected by the Bureau of Labor Statistics. Using the census findings, the BLS "rebased" its estimates of household employment (Chart 4).

As the chart shows, the BLS revised household employment upward by approximately 1.5 million following the 1980 census. As a result of the correction, the employment gap narrowed by roughly 2.1 percentage points—a substantial decrease.

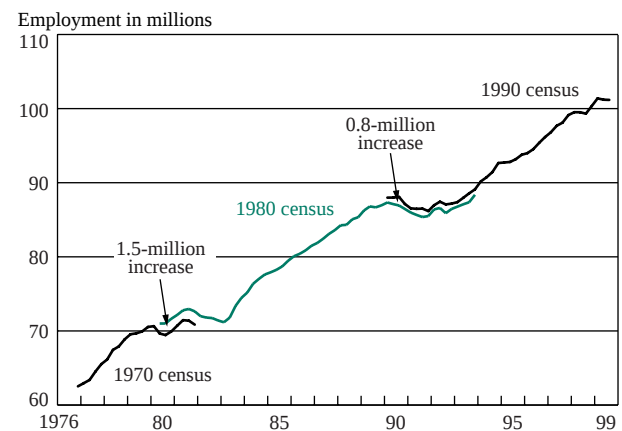
After the release of the 1990 census figures, the BLS raised household employment by approximately 832,000.¹⁴ Although the estimated undercount in the 1990 census was a sizable 1.8 percent, the BLS was able to make a partial adjustment for the undercount using a post-enumeration survey of census respondents that revealed that many working-age people had been missed.¹⁵ The resulting decrease in the employment gap was slightly less than 1 percentage point. Although this decrease is more modest than that produced by the updating of the 1980 population, it provides additional evidence that the employment gap is very sensitive to upward revisions of the household survey estimates.¹⁶

A Hidden Labor Force

The undercounting of the working-age population, when combined with multiple jobholding, can explain the difference in the levels of the payroll and household employment series. However, the mere fact that a portion of the adult population is overlooked in the household survey cannot explain the cyclical behavior of the employment gap or, more specifically, the dramatic increase in the employment gap in recent years. To understand these trends, we need to know more about the identity and employment behavior of the undercounted groups.

Using the indirect evidence available to us, we conclude that the groups underrepresented in the census—and thus in the household survey—are also those whose

Chart 4
Revisions to Household Employment following the 1980 and 1990 Census Counts



Source: U.S. Department of Labor, Bureau of Labor Statistics.

employment is likely to fluctuate with changes in the business cycle. For example, estimates suggest that 10.9 percent of black males were undercounted in the 1940 census, double the 5.4 percent undercount of the overall population.¹⁷ Despite advances in census accuracy, the net undercount for black males remained high in the 1990 census, at 8.5 percent. This group also typically experiences the largest employment swings over the business cycle. For example, since 1992—the first full year of the current expansion—employment of black males increased 5 percentage points, from 55 to 60 percent, while employment of white males rose just 2 percentage points. Furthermore, from second-quarter 1992 to second-quarter 1999, the employment-to-population ratio among black males who were between sixteen and twenty-four years old and had no more than a high school education rose a full 13 percentage points, from 44 to 57 percent.¹⁸

This evidence suggests that the groups not fully captured by the household survey are moving into the documented employment sector as labor market conditions improve. Their inclusion in their employers' payroll records means that they will be counted in the govern-

Groups not fully captured by the household survey are moving into the documented employment sector as labor market conditions improve.

ment's payroll survey. Thus, the surfacing of this hidden labor force when the economy is strong could very well explain why payroll employment growth has outpaced household employment growth most dramatically during expansions and why the gap has become particularly large in recent years.

How much of the increase in the employment gap could potentially be explained by the 1990 census undercount of such workers? If we assume a 2 percent undercount for the working-age population of 200 million, we would have approximately 4 million undercounted people in 1994. If half of the undercounted group found formal employment over the 1994-99 period, they would account for 2 million of the 4 million difference in the household and payroll estimates of employment growth since 1994—or roughly one-half of the gap.¹⁹

Conclusion

The increasing disparity between the employment estimates reported in the payroll and household surveys has puzzled many analysts. We argue that the household

survey probably underreports employment because its estimates incorporate a census undercount of the working-age population. The higher figures in the payroll survey are more reliable, accurately capturing the effects of the current economic expansion on the employment status of many adults overlooked by the census.

Notes

1. The payroll survey—the headline source for job growth—is officially known as Current Employment Statistics (CES); the household survey is known as the Current Population Survey (CPS). Both surveys are produced by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). Their results, available monthly, are released jointly as the Employment Situation Summary.

2. Even within these categories, there are minor differences between the surveys. For a clear and useful description of the differences in survey design, see Schweitzer and Ransom (1999).

3. More precisely, we take the natural logarithm of the ratio of payroll employment to household employment.

4. Statistical tests of the relationship between the civilian unemployment rate and the gap indicate that the unemployment rate can explain a large share—about 50 percent—of the variation in the gap.

5. Using the 1994-99 monthly samples for the household survey, we calculated the total number of private wage and salary workers (including the incorporated self-employed) who were sixteen years of age or older, did not cite agriculture as their industry of employment, and reported holding more than one job. Although the number of multiple jobholders may not be fully represented in the household survey (see our discussion of this survey's undercount problems), the ratio—the share of multiple jobholders—should still be informative.

6. Cohany, Polivka, and Rothgeb (1994) report that in May 1991 and fourth-quarter 1993, 6.2 percent of employed people were multiple jobholders.

7. See, for example, Epstein (1993), Koretz (1994), and *Wall Street Journal* (1996).

8. The bias adjustment factor is derived from the following components: (1) the difference between actual benchmarked employment levels and the employment levels derived from the payroll survey samples for the previous three years; (2) a cyclical component incorporating the previous two quarters' employment changes in the payroll survey, multiplied by a regression coefficient relating survey employment growth to employment growth in the universe of unemployment insurance (UI) records; and (3) an adjustment factor that incorporates information from the UI records, available with a three-quarter lag.

9. Epstein (1993), for example, questions whether past undercounts of employment should be used to predict current undercounts—particularly when evidence suggests that economic conditions are unstable.

10. This information is available at the BLS web site, under Current Employment Statistics (<http://stats.bls.gov/80/cesbm98.htm>).

11. Coverage varies by state, but the 47,000-household figure corresponds to less than .05 percent of the civilian noninstitutional population.

12. The census is the universe from which the Bureau of Labor Statistics selects a sample of households to be interviewed each month. The population estimates use the previous census as the base figure for resident population, and population levels are projected forward on an annual basis using administrative data on births, deaths, and net legal immigration. These estimates are derived by state of residence, age, sex, race, and Hispanic origin. For further details, see U.S. Department of Labor (1992) and Stinson (1994).

13. See Table 2 in Robinson et al. (1993).

14. We were unable to find records of revisions to the disaggregated category—private nonagricultural wage and salary employment—that we are analyzing. Total employment, however, was revised upward by the BLS by approximately 350,000 following the 1950 census, revised downward by roughly 200,000 after the 1960 census, and revised upward by 333,000 or so after the 1970 census.

15. In the post-enumeration survey, a subset of individuals first captured in the census were reinterviewed. By comparing the results of the survey and the census, the BLS estimated the share of the population missed in the census. Overall, the 1990 population estimates together with the post-enumeration survey adjustments increased the working-age population by 1.25 million.

16. The undercount problems associated with the household survey do not extend to such employment measures as the total civilian unemployment rate or the total civilian labor force participation rate. The BLS calculates these measures as a ratio in which both the numerator and the denominator include estimates of the population; thus, any errors in the data would likely cancel each other out.

17. Our example focuses on black males because data on this group are more readily available than data on other groups likely to be underrepresented.

18. These figures are based on our calculations from the monthly outgoing Current Population Survey samples. Freeman and Rodgers (1999) report an even larger change.

19. Although a 50-percentage-point change in the employment rate of this undercounted group seems large, it is unlikely that the change reflects only the movement from nonemployment to employment. Rather, a large portion of this change probably reflects movement from the informal, undocumented sector (“off-the-books” employment) to the documented sector.

References

- Cohany, Sharon R., Anne E. Polivka, and Jennifer M. Rothgeb. 1994. “Revisions in the Current Population Survey Effective January 1994.” U.S. Bureau of Labor Statistics *Employment and Earnings*, February: 13-35.
- Epstein, Gene. 1993. “Pulling the Plug on Employment Numbers.” *Barron's*, June 7.
- Freeman, Richard B., and William M. Rodgers III. 1999. “Area Economic Conditions and the Labor Market Outcomes of Young Men in the 1990s Expansion.” NBER Working Paper no. 7073.
- Koretz, Gene. 1994. “Too Much Fudge in Job Numbers?” *Business Week*, November 21.
- Robinson, J. Gregory, et al. 1993. “Estimation of Population Coverage in the 1990 United States Census Based on Demographic Analysis.” *Journal of the American Statistical Association* 88 (September): 1061-71.
- Schweitzer, Mark, and Jennifer Ransom. 1999. “Measuring Total Employment: Are a Few Million Workers Important?” Federal Reserve Bank of Cleveland *Economic Commentary*, June.
- Stinson, John. 1994. “How the Government Measures Unemployment.” U.S. Bureau of Labor Statistics Report no. 864, February.
- U.S. Department of Labor. Bureau of Labor Statistics. 1992. *BLS Handbook of Methods*. Washington, D.C.: Bureau of Labor Statistics.
- Wall Street Journal*. 1996. “Missing: 3.1 Million Jobs.” March 13, A14.

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The views expressed in this article are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

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